2015

Santa Clara Valley Water District

Urban Water Management Plan

Report Only

Santa Clara Valley Water District

2015 Urban Water Management Plan

Prepared by:

Tracy Hemmeter
Senior Project Manager

Michael Martin
Environmental Planner II

Eric Olson
Engineering Systems Analyst

Cris Tulloch
Associate Water Resources Specialist

Justin Burks
Water Conservation Specialist II

Under the Direction of:

James Fiedler
Chief Operating Officer,
Water Utility Enterprise

Garth Hall
Deputy Operating Officer,
Water Supply Divison

Gerald De La Piedra
Unit Manager,
Water Supply Planning and Conservation

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And the following contributors:

Benjamin Apolo III
Cindy Kao
Debra Caldon
Debra Osikominu
Erin Baker
James O'Brien
Katrina Jessop
Luis Jaimes
Melih Ozbilgin
Miguel Silva
Vanessa De La Piedra
Xiaoyong Zhan

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Chapter 1 – Introduction and Overview

The Urban Water Management Planning Act (UWMP Act) (Division 6 Part 2.6 of California Water Code §10610 - 10656) requires the preparation of an Urban Water Management Plan (UWMP) every five years by water suppliers that provide over 3,000 acre-feet of water annually or serve water for municipal purposes either directly or indirectly to 3,000 or more customers. The Santa Clara Valley Water District (District) meets the definition of an urban water supplier and has prepared UWMPs since 1985. This 2015 UWMP documents important information on water supply, water usage, recycled water, water conservation programs, water shortage contingency planning, and water supply reliability in Santa Clara County. It also serves as a valuable resource for water supply planners and policy makers, and addresses the water supply future of Santa Clara County over the next 25 years. The 2015 UWMP updates and supersedes all previous UWMPs.

The UWMP complements other District water resource planning efforts including planning for annual operations, sustainable groundwater management, recycled water, integrated water resource management, and integrated regional water management. Most importantly, it provides the demand and supply projections that form the basis of the District's Water Supply and Infrastructure Master Plan (Water Master Plan), which presents the District's strategy for providing a reliable future water supply for Santa Clara County and ensuring new water supply investments are effective and efficient. The Water Master Plan is scheduled to be updated in 2017.

This 2015 Urban Water Management Plan was prepared in compliance with the requirements of the current UWMP Act and under the guidance provided by California Departement of Water Resources (DWR). The UWMP follows the organization recommended by DWR:

- Chapter 1 – Introduction and Overview
- Chapter 2 – Plan Preparation: Provides information on the process for developing the UWMP, including efforts in coordination and outreach
- Chapter 3 – System Description: Includes maps, a description of the service area and climate, and the District's organizational structure and history
- Chapter 4 – Water Demands: Describes and quantifies current and projected water demands in Santa Clara County
- Chapter 5 – Baselines and Targets: Describes the District's efforts to support retailer efforts to achieve 2020 water use targets
- Chapter 6 – System Supplies: Describes and quantifies the current and projected sources of water available to the District.
- Chapter 7 – Water Supply Reliability: Evaluates the reliability of the water supply over the next 25 years for normal, single dry, and multiple dry years.
- Chapter 8 – Water Shortage Contingency Planning: Includes the District's staged plan for dealing with water shortages, including a catastrophic supply interruption.
- Chapter 9 – Demand Management Measures: Describes the District's efforts to promote water conservation and reduce demand.
- Chapter 10 – Plan Adoption, Submittal, and Implementation: Describes the steps taken to adopt and submit the UWMP and make it publically available, how the plan will be implemented, and DWR's Checklist.

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Chapter 2 – Plan Preparation

This chapter provides information on the process for developing the UWMP, including efforts in coordination and outreach. Coordination and outreach are key elements to developing a useful and accurate UWMP.

2.1 Approach to Preparing the UWMP

The UWMP Act requires that urban water suppliers[1] prepare an UWMP and update its plan at least once every five years. The District meets the definition of an urban water supplier and is required to submit its 2015 UWMP to DWR by July 1, 2016.

The UWMP Act requires use and submittal of standardized tables. DWR has developed separate tables for retail and wholesale water suppliers. The District is wholesale water supplier – it provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes[2]. The District is not a retail water supplier because it does not directly provide potable municipal water to more than 3,000 end users or supply more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

The District is also the groundwater management agency for Santa Clara County and utilizes a conjunctive use strategy. As such, it considers additional demands and supplies in the county as part of its water management activities, including planning. It is important that this UWMP reflect the comprehensive nature of the District's water management program for the county. The tables in the main body of this plan reflect all the supplies and demands in the county, not all of which are managed by the District and can be reported as District supplies on DWR's standardized tables. All the DWR-required tables are included in Appendix A.

2.2 Basis of Planning

The District is engaged in regional water supply planning and coordinates with regional partners. However, this is an individual UWMP that reports on water demands and supplies in Santa Clara County. Data in all the tables are presented by calendar year and in acre-feet.

2.3 Coordination and Outreach

This UWMP was prepared in coordination with the 13 major water retailers[3] in Santa Clara County, the cities in Santa Clara County, the County of Santa Clara (County), the San Francisco Public Utilities Commission (SFPUC), and the Bay Area Water Supply and Conservation Agency (BAWSCA). The District notified the agencies and water retailers that is was updating its UWMP by letter dated February 3, 2016 (consistent with CWC 10621(b)). On March 21, 2016, the District emailed its preliminary reliability analysis and Water Shortage Contingency Plan to its water retailers. Supplies were projected in five-year increments from 2015 through 2040 for normal, single dry, and multiple dry years (consistent with CWC 10631). On April 1, 2016, the District provided the retailers with a draft Urban Water Management Plan for review. The District notified water retailers on May 3, 2016 and the cities and County on May 6, 2016 of the time and date of the public hearing on the 2015 UWMP and provided information on how to review the UWMP. Documentation of these efforts is included in Appendix B. In addition

[1] California Water Code defines urban water supplier as "a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually."

[2] California Water Code 10608.12 (r) defines an urban wholesaler water supplier as "a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purpose."

[3] The District coordinated preparation of this UWMP with the following water retailers in Santa Clara County: California Water Service Company, City of Gilroy, Great Oaks Water Company, City of Milpitas, City of Morgan Hill, City of Mountain View, City of Palo Alto, Purissima Hills Water District, San Jose Municipal Water System, San Jose Water Company, City of Santa Clara, Stanford University, and City of Sunnyvale.

to these required coordination efforts, the District, agencies, and retailers had numerous group and individual communications related to demand projections, water shortage contingency planning, the potential for a regional alliance for SB x7-7 compliance, and reliability analyses.

The District incorporated input, as appropriate, that was received from the agencies and retailers, along with input from the Santa Clara Valley Water Commission and Sierra Club Loma Prieta Chapter, prior to posting the UWMP for public review. The public review draft UWMP was posted on the District's web site and made available for public inspection on May 4, 2016. The public hearing on the UWMP was advertized in a local newspaper on May 10, 2016 and May 17, 2016 in accordance with California Government Code 6066. A copy of the public notice is included in Appendix B. The public hearing was held on May 24, 2016. Comments were received from several retailers and six other parties before or at the public hearing. Additional information on the adoption of the UWMP is provided in Chapter 10.

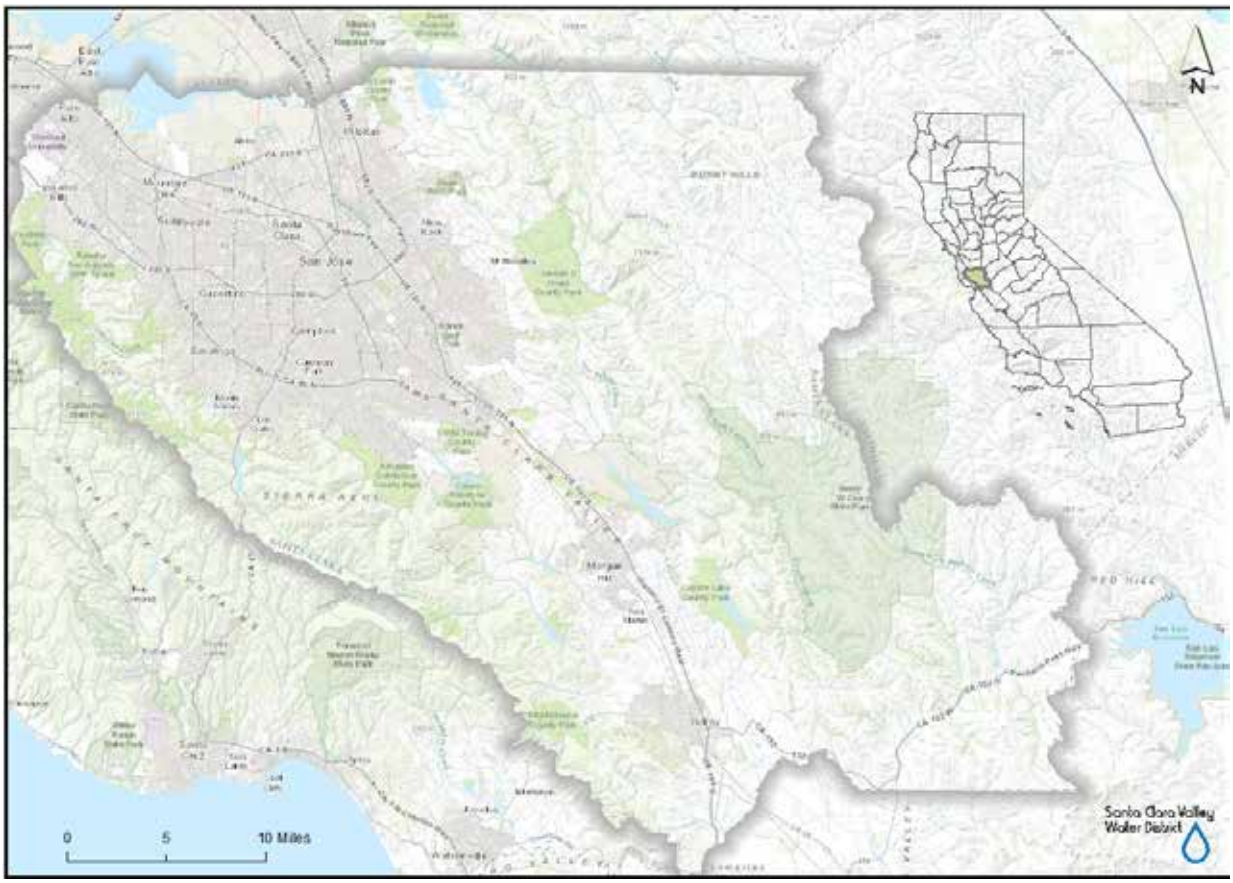
Chapter 3 – System Description

This chapter describes the District, presents an overview of the District's water supply system, and summarizes climate and demographic information for Santa Clara County. This type of information is useful in developing demand projections and providing a clearer understanding of the various elements of water supply and demand.

3.1 District Overview

The District is an independent special district that provides wholesale water supply, groundwater management, flood protection and stream stewardship. Its service area includes all of Santa Clara County, which is located at the southern end of San Francisco Bay (Figure 3-1). The county encompasses approximately 1,300 square miles and has a population of about 1.9 million. Most water use occurs on the valley floor between the Santa Cruz Mountains to the west and the Diablo Range to the east. Northern Santa Clara County is home to Silicon Valley and the valley floor is highly urbanized. Southern Santa Clara County has some urban development, but much of the land use is still rural and agricultural.

Figure 3-1. Santa Clara County



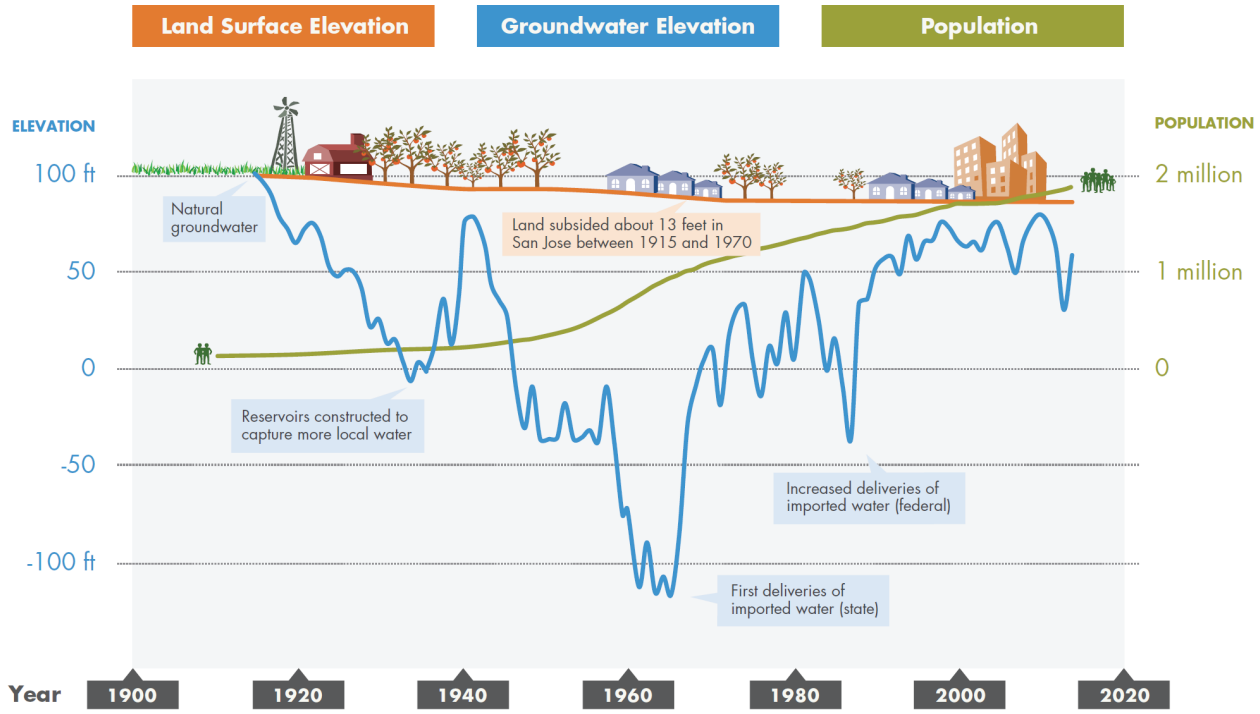
The District was formed as the Santa Clara Valley Water Conservation District in 1929 in response to groundwater overdraft and significant land subsidence. In 1954, it annexed the Central Santa Clara Valley Water District. In 1968, it merged with the countywide flood control district to form one agency to manage the water supply and flood programs for most of the county. The Gavilan Water District in southern Santa Clara County was annexed in 1987 and now the Santa Clara Valley Water District provides services for the entire county. The District is governed by an elected seven member Board of Directors following the District Act

(http://www.valleywater.org/About/DistrictAct.aspx) and it own Board Governance Policies (http://www.valleywater.org/About/BoardPolicies.aspx).

The District has been a leader in conjunctive use in California for decades, utilizing imported and local surface water to supplement groundwater and to maintain reliability in dry years. Conjunctive use helps protect local subbasins from overdraft, land subsidence, and saltwater intrusion and provides critical groundwater storage reserves for use during droughts or outages.

Figure 3-2 shows how the District's water management activities have dramatically contributed to a sustainable water supply. After it was formed to address declining groundwater levels and land subsidence, the District constructed reservoirs to capture more local water. However, local supplies were insufficient to meet the county's growing population. The District began importing water from the State Water Project in 1965 and from the Central Valley Project's San Felipe Division in 1987. These investments, along with water recycling and conservation, have resulted in sustainable groundwater subbasins and reliable water supplies for the county

Figure 3-2. Historic Groundwater Conditions



Over the years, the water district's water importation and groundwater management activities have stabilized groundwater levels and prevented land subsidence, or sinking.

About half of the county's water supply currently comes from local sources and about half comes from imported water sources. Imported water includes the District's State Water Project and Central Valley Project contract supplies and supplies delivered by the San Francisco Public Utilities Commission (SFPUC) to cities in northern Santa Clara County. Local sources include natural groundwater recharge and surface water supplies, including surface water rights held by the District, San Jose Water Company, and Stanford University. A small but growing portion of the County's water supply is recycled water. The District supplies are used to recharge the local groundwater subbasins, treated at drinking water treatment plants, released to local creeks to meet environmental needs, or

sent directly to water users. The water supply system is illustrated in Figure 3-4. Santa Clara County water supply and use for 2015 is illustrated in Figure 3-5.

3.2 Service Area Climate

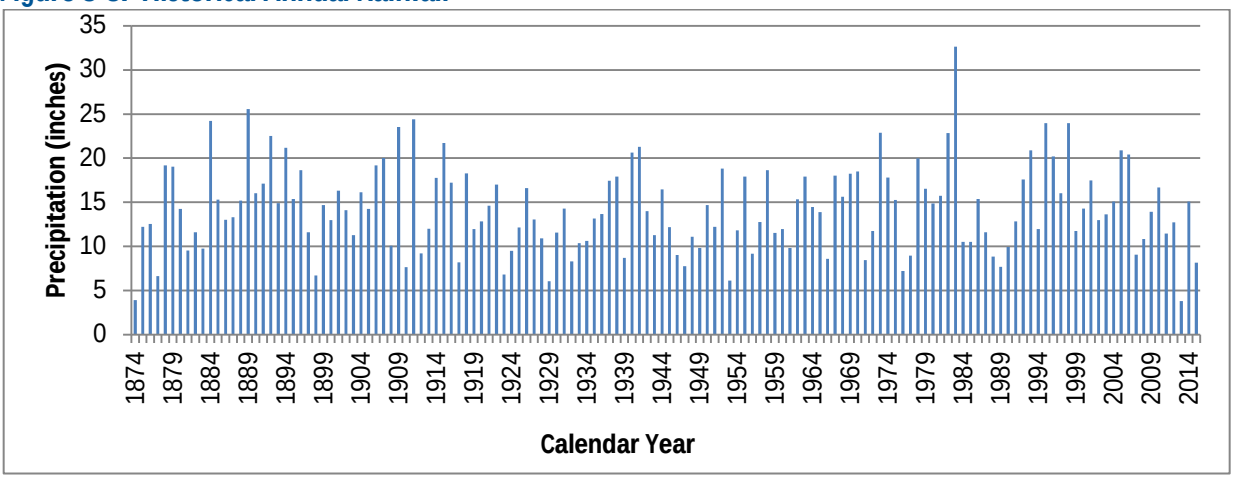
The county's Mediterranean semi-arid climate is temperate year-round, with warm and dry weather lasting from late spring through early fall. Average annual precipitation ranges from about 15 inches on the valley floor to about 45 inches along the crest of the Santa Cruz Mountains. The average annual rainfall in downtown San Jose is 14.3 inches, with most precipitation occurring between the months of November and April. The county's temperature is generally moderate. Maximum daily temperatures averaged by month in San Jose range from 58.4°F to 82.1°F. The average annual evapotranspiration (ETo) is 49.6 inches. Table 3-1 summarizes historic average monthly and annual climate data.

Table 3-1. Average Climate Data[1]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Rainfall (inches)	2.8	2.6	2.3	1.1	0.4	0.1	0.0	0.0	0.2	0.7	1.5	2.5	14.3
Maximum Daily Temperature (°F)	58.4	62.2	65.7	69.7	74.4	79.2	82.1	81.8	80.6	74.6	64.9	58.4	71.0
Minimum Daily Temperature (°F)	41.8	44.5	46.0	47.8	51.6	55.1	57.3	57.4	56.4	52.1	45.9	41.7	49.8
Standard Monthly Average ETo (inches)	1.5	1.9	3.5	5.0	6.0	6.8	7.0	6.3	4.8	3.5	1.9	1.4	49.6

Figure 3-3 shows the variability in historical rainfall that has occurred in downtown San Jose. Rainfall has ranged from 3.8 inches in calendar year 2013 to 32.6 inches in 1983. The District's conjunctive use strategy (the coordinated use of surface water and groundwater) helps maintain groundwater levels and manage supply variability.

Figure 3-3. Historical Annual Rainfall[2]



[1] Rainfall from District Station 86 (1874 – 2015), temperature from University of California Davis (1951 - 2015), and ETo from District Alamitos Station.CIMIS data for San Jose.
[2] From Station 86

Figure 3-4. Water Supply System

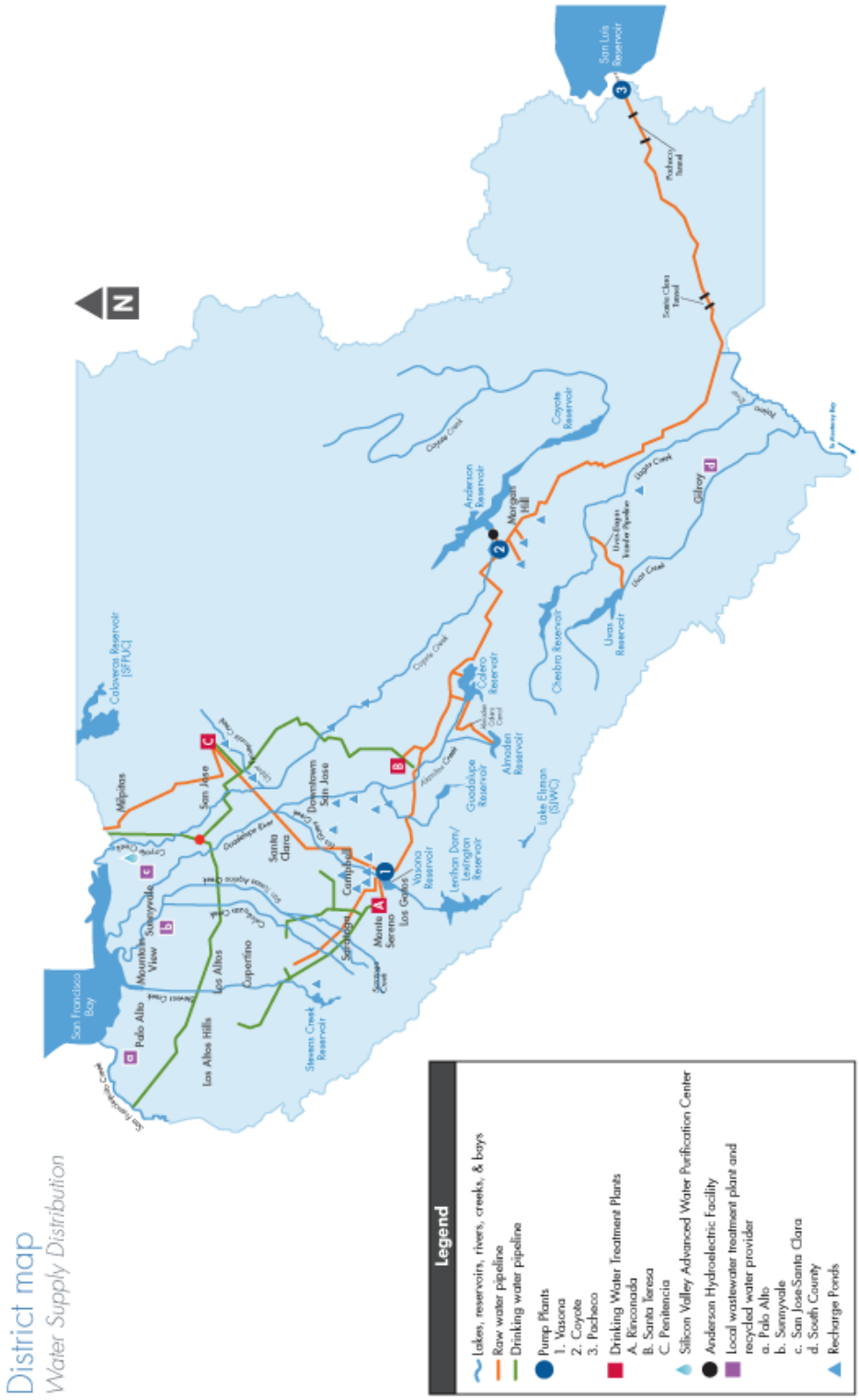
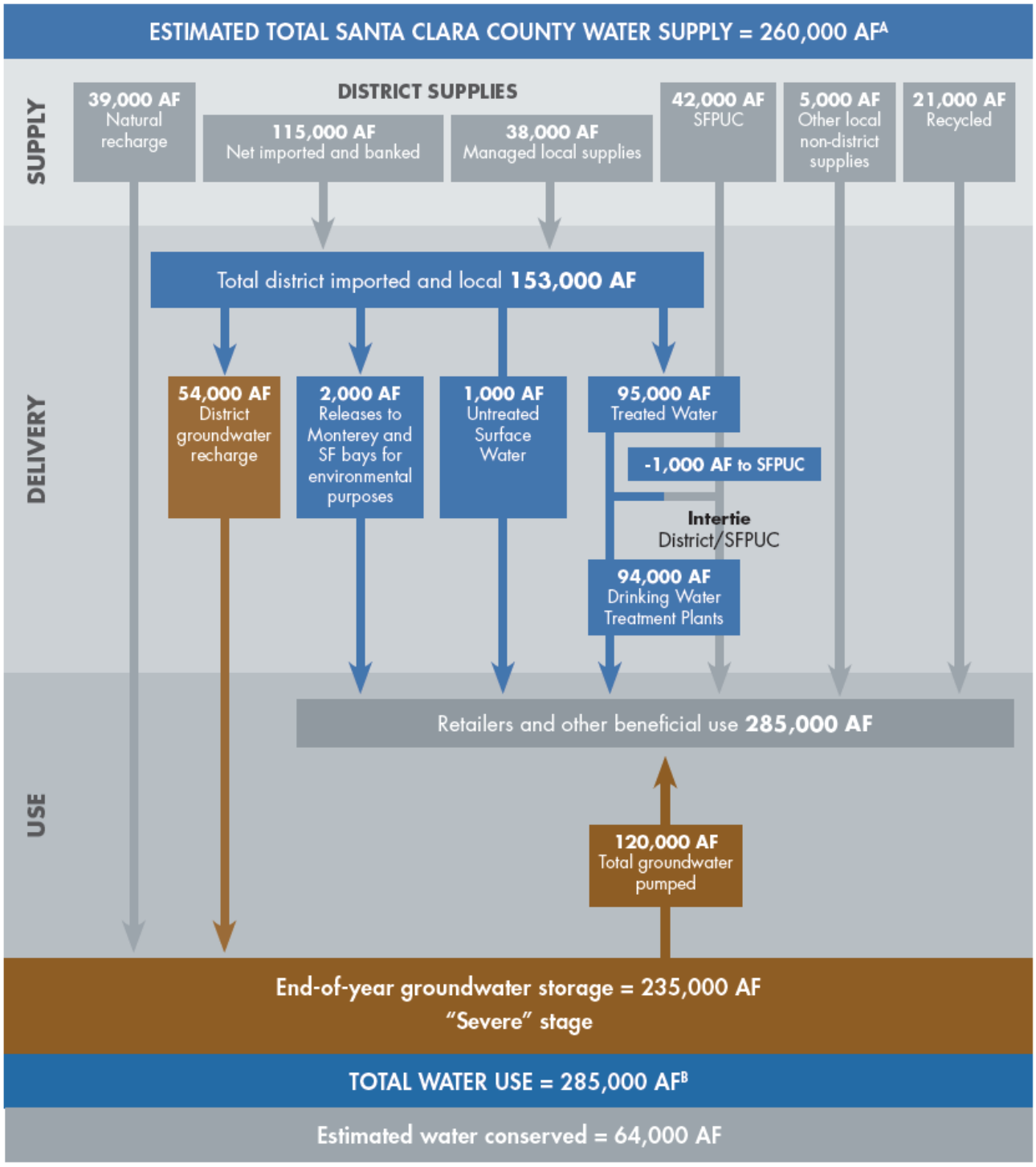


Figure 3-5. 2015 Water Supply and Use



[A] Includes net district and non-district surface water supplies and estimated rainfall recharge to groundwater basins.
[B] Includes municipal, industrial, agricultural and environmental uses.

3.3 Climate Change

Evidence of climate change is already being observed in California. In the last century, the California coast has seen almost eight inches of sea level rise. The average April 1 snow-pack in the Sierra Nevada region has decreased in the last half century. As a result of the changing climate, wildfires are becoming more frequent, longer, and more wide-spread. Historical precipitation data for California's central coast region shows a trend toward decreasing rainfall during the November to January period and a trend toward increasing rainfall during the February to April period. Temperature projections for the Bay Area show a shift in the timing of spring and summer heat extremes to begin earlier and extend later into September, as well as an increase in the frequency and intensity of heat waves.

Locally, Santa Clara County is expected to see increasing temperatures. Increased temperatures could result in more extreme heat and drought events, an increased wildfire risk (especially when combined with reduced precipitation), and increased demands. Future projections of precipitation are not as clear. However, some studies indicate storms could become more intense and rainfall patterns could change, but not necessarily have a large impact on average annual rainfall amounts. More severe storms could result in increased flood risk and change in patterns that could challenge local water supply operations. Sea level rise is also projected to continue to increase and this also increases flood potential. The District Climate Change Vulnerability Assessment is in Appendix C.

3.4 Service Area Population and Demographics

The demographic projections from the Association of Bay Area Governments (ABAG) Projections 2013 are summarized in Table 3-2. Projected population and job growth rates for Santa Clara County are higher than the nine-county Bay Area average. ABAG projects that Santa Clara County's population will increase by about 23 percent between 2015 and 2040, up to about 2.4 million in 2040. Total jobs are projected to increase an estimated 18 percent in the same time period. However, job growth is not projected to be equal in all sectors. Agricultural jobs are projected to decrease, manufacturing jobs are projected to be stable, and other job sectors are projected to increase. The greatest projected increase is in health and education services.

Table 3-2. Santa Clara County Demographics from ABAG Projections 2013

	2015	2020	2025	2030	2035	2040
Population	1,877,700	1,977,900	2,080,600	2,188,500	2,303,500	2,423,500
Household Population	1,845,800	1,944,800	2,045,800	2,152,100	2,263,900	2,381,000
Households	639,160	675,670	710,610	747,070	782,120	818,400
Persons per Household	2.89	2.88	2.88	2.88	2.89	2.91
Employed Residents	881,770	968,790	1,003,550	1,039,330	1,085,880	1,133,950
Total Jobs	1,003,780	1,091,270	1,118,320	1,147,020	1,187,010	1,229,520

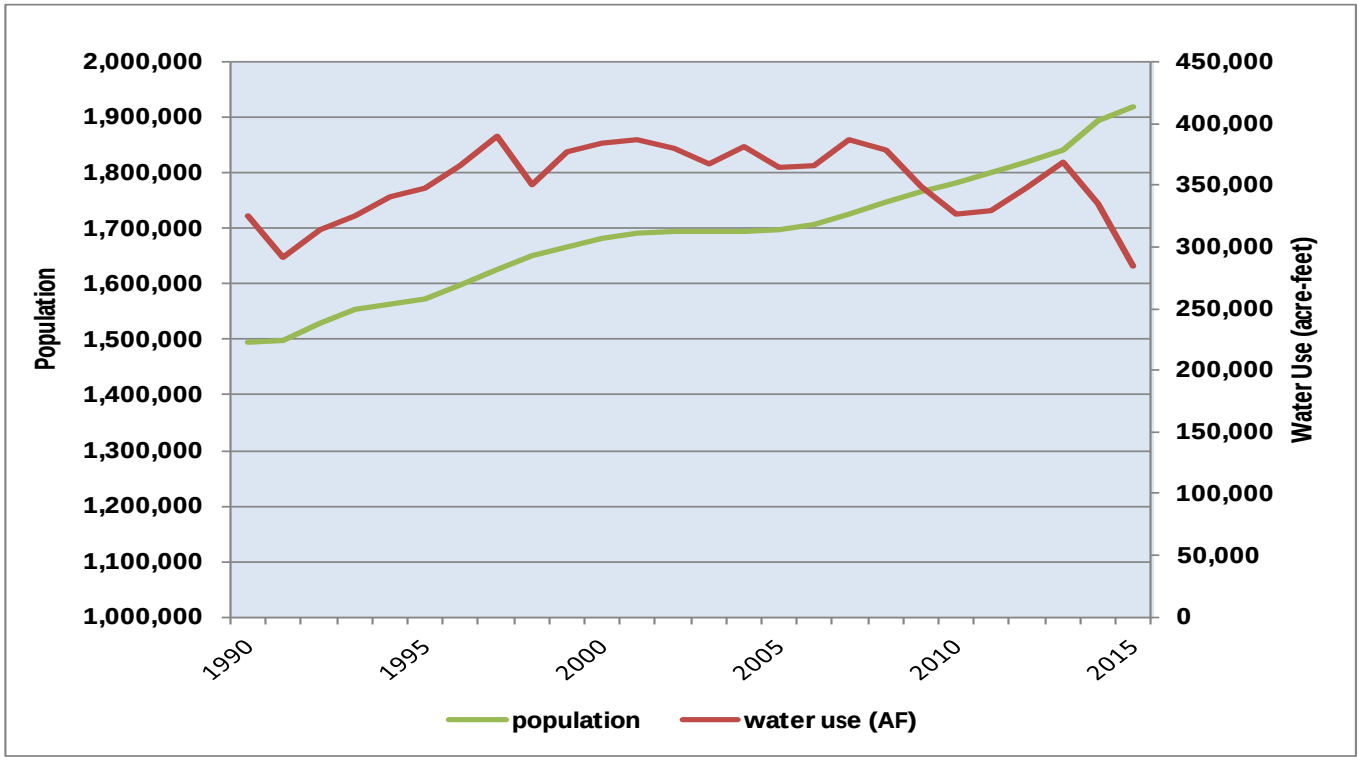
Chapter 4 – Water Demands

This chapter describes and quantifies Santa Clara County's current water use and water demand projections through the year 2040. Accurately tracking and reporting current water demands allows the District to properly analyze the use of the county's water resources and conduct effective resource planning. Estimating future demand allows the District to manage the county's water supply and appropriately plan infrastructure investments. Assessments of future growth and related water demand, done in coordination with local planning agencies, provide essential information for developing demand projections. Demand estimates were provided for the most part by the water retailers, and are meant to be consistent with their UWMPs and local planning assumptions. The District coordinated with the water retailers and the local planning agencies on demand projections to the extent practicable.

4.1 Historical and Current Water Use

Historical water use is illustrated in Figure 4-1. This graph shows that while population continues to increase, overall water use has stayed about the same on average (prior to the recent drought). Hydrology, calls for short-term water use reductions, and economic conditions all play a part in year to year changes in water use patterns. The most dramatic variations in Figure 4-1 are the drops in use during the droughts of 1987-1992[1], 2007-2009 and 2013-2015; and the economic decline starting in 2008.

Figure 4-1. Historic Water Use and Population



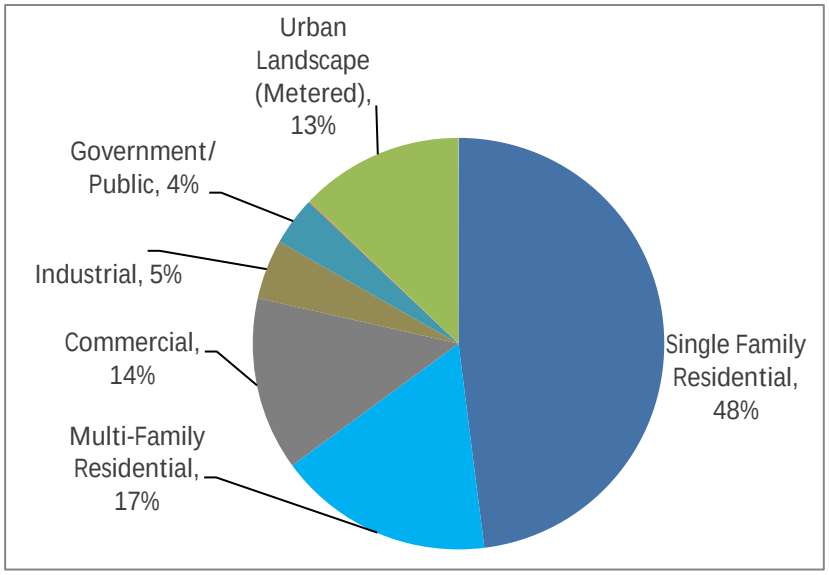
During times of drought, due to supply limitations and water use reduction measures, water use is shown to decrease. Following times of drought, water use generally returns to pre-drought usage, although the rebound in

[1] Pre-1990 data is not shown due to incomplete data.

use may take a couple of years to be seen. This is illustrated by the 1997 water use after the 1987-1992 drought, which is likely a combination of post drought rebound and economic growth.

Water use data from water retailer biling information from 2013 was used to determine the approximate distribution of sales by water use sectors, as shown in Figure 4-2. The chart includes data for all the retailers that track use in these sectors. Since not all retailers track their use in all of these sectors, it only represents some of the county wide use. However, it is believed to be a relatively good picture of average water use distribution. It is interesting to note that while not all retailers track landscape use separately, and that this sector only represents large scale metered landscape irrigation, it represents 13 percent of use. If residential and commerical mixed-use landscape irrigation was shown as part of the urban landscape percent, that percentage would be expected to increase dramatically.

Figure 4-2. Water Use by Sector (2013)



4.2 Projected Water Demands

The District's countywide demand projections include the categories described below.

4.2.1 Water Retailer Demands

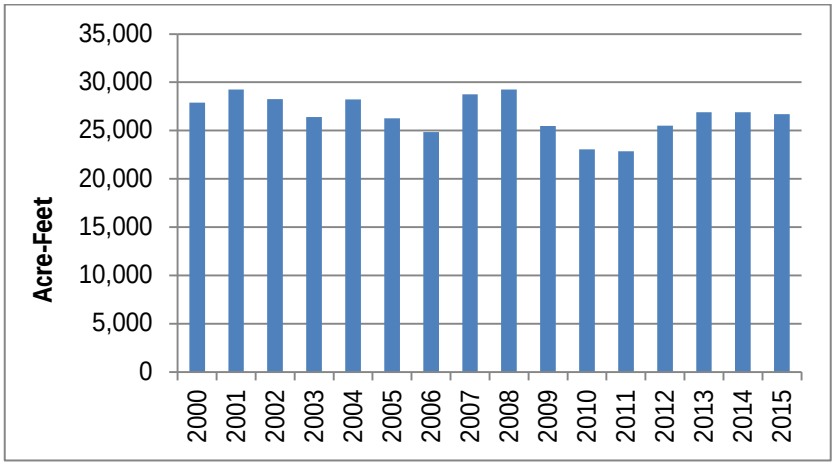
The retailer demands are based on projections provided by the retailers. Please see Section 4.3 and Appendix D for detailed discussion of demand projections and coordination with retailers. The retailer demand projections include potable use and recycled water demands and account for long-term water conservation savings.

4.2.2 Agricultural Groundwater Pumping

Agricultural groundwater pumping[2] averaged 25,980 acre-feet annually between 2005 and 2014. The District used that historic average, held constant into the future, as the projected agricultural pumping. The assumption to hold agricultural pumping contant into the future is based on published studies, reports, and land use plans. Hydrology is probably the largest factor in agricultural water use, and the annual variations illustrated in Figure 4-3 are expected to continue into the planning horizon. Historically, there is evidence of significant reductions in harvested acres and in agricultural water use. Declines in the number of harvested acreage over time is the result of both increasing urban development and higher productivity (resulting in growth in the value of agriculture per acre and per worker). However, land use plans and agricultural reports indicate that the amount of harvested acreage is likely in a stable state, with only minor declines due to increased urban development. Furthermore, the labor force in the sector does not show projected declines of any significance until 2030 (ABAG Plan Bay Area 2013). Even if labor does decline, unlike other sectors, this does not necessarily equate to reduction in water demand. In addition, a review of groundwater use in the agricultural sector from 2000 through 2015 shows only a slight decline, similar to what the county has seen in the M&I sector.

[2] Groundwater pumping volumes are based on the volumes metered by the District or reported to District.

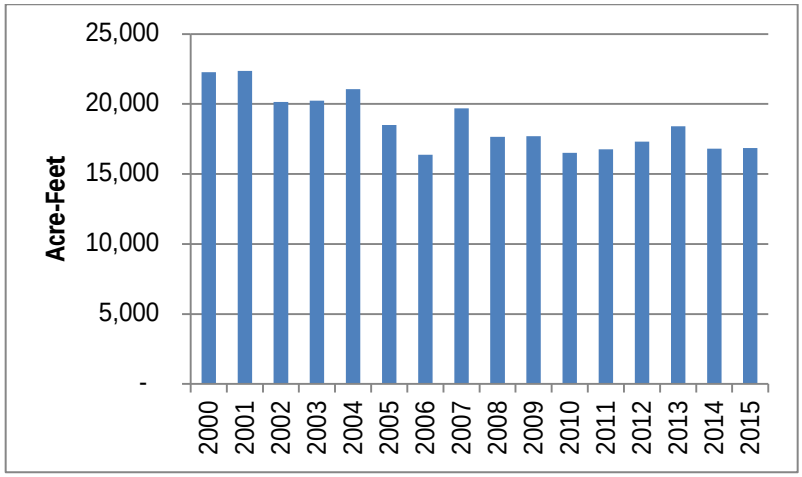
Figure 4-3. Historic Agricultural Groundwater Pumping



4.2.3 Independent Groundwater Pumping

Independent groundwater pumping includes groundwater pumping by individual domestic well owners, small and mutual water companies, businesses, non-agricultural irrigation, and environmental cleanup. It includes all non-retailer groundwater pumping in the Municipal and Industrial (M&I) and domestic categories. The independent groundwater pumping demand estimate of 17,600 AFY is based on the average of 2005 to 2014 actual water use, held constant into the future. The demand is held constant due to the mix of uses in this sector that cannot be summarized by any one published growth projection or study. There are too many variables to create reasonable growth scenarios. Maintaining the current demand is an appropriate and conservative approach. If water uses in this aggregated sector change considerably in the future, the District will evaluate conditions at that time.

Figure 4-4. Historic Independent Groundwater Pumping



4.2.4 Raw Water

A small amount of untreated imported and local surface water is available to surface water customers and is considered 'raw water' (Untreated Water Program). The water is used primarily for landscape and agricultural irrigation. The District is currently updating its Untreated Water Program rules and anticipates reducing deliveries for residential landscaping. In addition, some customers anticipate switching to recycled water. Therefore, to

estimate future demands for this sector, the District used the average of historic use for customers that are anticipated to remain in the program and held that demand at a constant rate into the future.

4.2.5 Distribution System Water Losses

Distribution system water losses (also known as "real losses") are the physical water losses from the water distribution system and the supplier's storage facilities, up to the point of customer consumption. As required by DWR, the District quantified its distribution system losses using the DWR Water Audit Method. A copy of the District's Water Loss Audit is in Appendix E.

4.2.6 Demand Tables

The District calculates demands for the entirety of water use within its service area by aggregating water demand reported from all suppliers in the service area (as recommended by DWR). This information is presented in Table 4-1. Section 4.3, Coordination With Retailers and Land Use Agencies, provides more background on the water demand projections. The retailer demands shown in Table 4-1 were provided by each retailer. The other demands were prepared by the District. Demand assumptions are discussed below and in Appendix D.

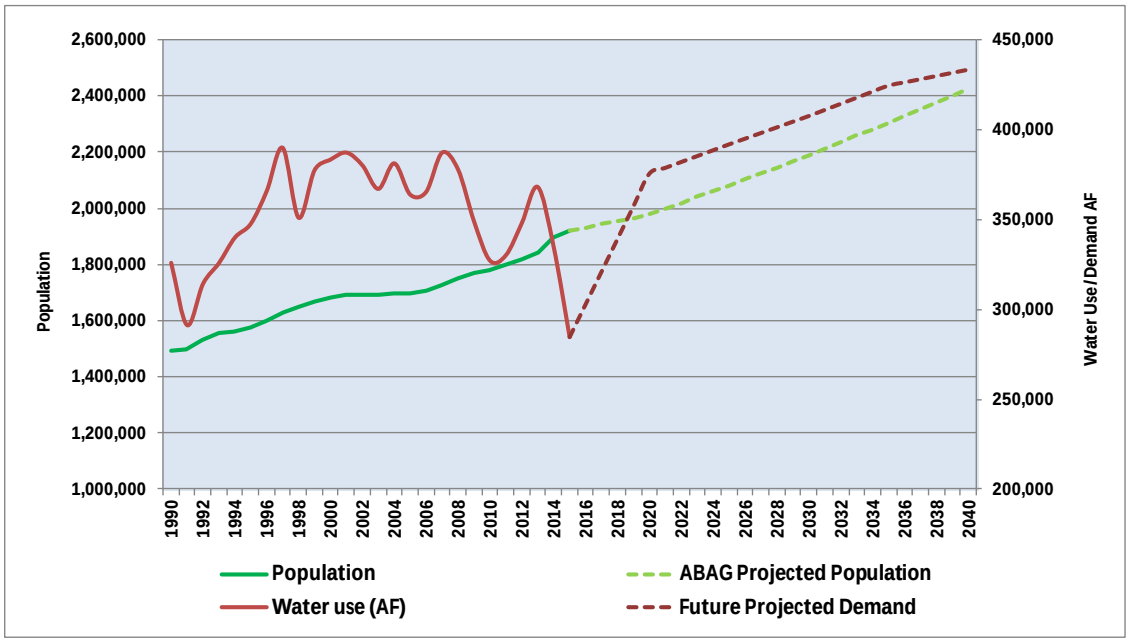
Table 4-1. Countywide Demand Projection (AF)[3]

Sector	2020	2025	2030	2035	2040
Water Retailers					
California Water Service Company	15,200	15,500	15,800	16,100	16,400
Gilroy, City of	11,700	13,400	15,000	16,000	17,100
Great Oaks Water Company	9,500	10,100	10,800	11,600	12,500
Milpitas, City of	17,800	19,800	21,900	24,600	24,600
Morgan Hill, City of	8,600	9,800	11,000	12,100	12,100
Mountain View, City of	12,500	12,700	13,000	13,300	13,700
Palo Alto, City of	12,000	11,600	11,400	11,100	11,000
Purissima Hills Water District	2,100	2,100	2,100	2,100	2,100
San Jose Municipal Water System	35,200	38,500	42,100	45,800	45,800
San Jose Water Company	144,600	152,100	158,400	163,800	169,400
Santa Clara, City of	27,600	29,500	29,900	30,600	31,400
Stanford University	3,400	3,700	3,900	4,300	4,700
Sunnyvale, City of	22,800	24,300	24,900	25,700	25,800
Agricultural Groundwater Pumping	26,000	26,000	26,000	26,000	26,000
Independent Groundwater Pumping	17,600	17,600	17,600	17,600	17,600
Raw Water	1,700	1,700	1,700	1,700	1,700
Losses	2,900	3,000	3,100	3,200	3,200
TOTAL	**371,200**	**391,400**	**408,600**	**425,800**	**435,100**

[3] The cities of Gilroy, Milpitas, and Morgan Hill submitted updated demand projection subsequent to the modeling and analyses performed as part of this UWMP and are not reflected in Table 4-1. Demand projections for 2040 increased by about 800 AF for Gilroy, decreased by about 800 AF for Morgan Hill, and increased about 3,300 AF for Milpitas. The newer demands will be incorporated into the modeling for the Water Supply and Infrastructure Master Plan update scheduled for 2017.

In Figure 4-5, the projected demands have been added to the previous data from Figure 4-1. The addition of future use illustrates the effect of the recent drought on water use. The near term future demand projection does not include the likelihood of a slower rebound in use as the drought subsides since the rate of rebound cannot be accurately predicted. However, in our near term water supply model, we have assumed that residual savings will stay and it may take a few years for water use levels to rebound. Future use also does not take into account the other variables of hydrology and economy. Without these inter-annual fluctuations, the illustration shows the expected relationship between population and future water use.

Figure 4-5. Historic Water Use and Estimated Future Use



4.3 Coordination with Retailers and Land Use Planning Agencies

The District is not a land use planning agency, but rather a wholesale water supplier and groundwater basin manager. Therefore, while it is not the purpose of the District or this plan to prescribe or project growth or land use decisions, it is in the best interest of the District, land use agencies and the community that land use planning and water management be coordinated wherever possible. In fact, the UWMP Guidelines suggest land use agency coordination in preparing water demand projections. Furthermore, general plan guidelines (California Governor's Office of Planning and Research, 2003) encourage inclusion of a water element in general plans to allow for consideration of water supply availability for subsequent land use and development decisions. Outside of the UWMP process, the District coordinates with land use planning agencies on certain developments during the Environmental Impact Review and Water Supply Assessment phases of development proposals.

This section describes efforts by the District to coordinate and understand land use planning assumptions as they affect projected changes in water demand for the purposes of this UWMP. Development of the water demand projections included coordination with water utilities and land use agencies, where feasible and appropriate.

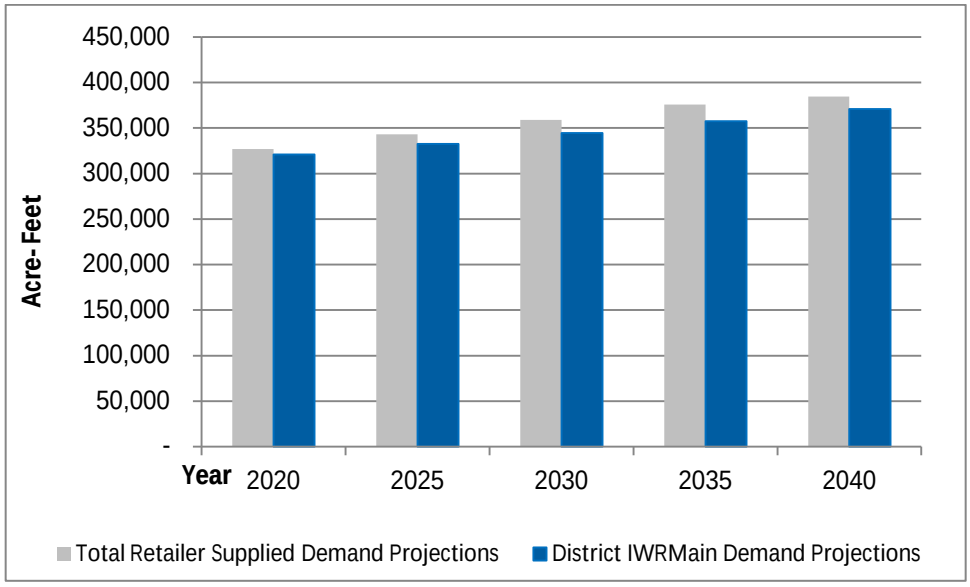
4.3.1 Water Retailer Coordination

Coordination efforts included collecting the retailers' water use projections for their service areas, and then meeting to discuss the growth assumptions and associated planning documents utilized by the retailer. The District

promoted having land use planning staff present at the meetings where appropriate or having planning agency information available. These meetings were valuable in understanding the retailers' projections and underlying assumptions regarding growth, including identifying source documents such as city general plans or ABAG regional planning projections.

After receiving the water retailers' water use projections, the retailer projections were compared to the demands in the 2010 UWMPs. Overall, the retailers' 2015 demand projections are lower than those in the 2010 UWMPs. Next, the District compared the retailer provided demands from their 2015 UWMPs with the demands estimated by District's IWRMain model, which uses demographic projections from ABAG's Plan Bay Area 2013 (described in Section 4.3.2 Regional Planning Coordination). The comparison between the retailers' provided demands and the District's IWRMain demand projections for the same service areas showed different demand estimates. However, when comparing the totality of the two, the total demands were within 2 percent to 5 percent of each other, depending on the projection year, with the difference increasing further into the future (Figure 4-6). It should be noted there are many reasons that the demands may differ - differences in base years, models, assumptions on growth, conservation factors, etc. Nevertheless, given the many ways models can differ and that the two projections are relatively close, it adds confidence that the growth scenarios considered in the regional planning document, Plan Bay Area from ABAG, and those considered by the individual retailers have overall alignment in the countywide demand projection. As mentioned, the District also made an effort to meet or discuss the planning basis and demand assumptions with each retailer, and some of the planning agencies. This coordination assists in understanding the planning assumptions and also adds confidence in the demand scenarios.

Figure 4-6. Comparison of Total Retailer Provided Demands and District IWRMain Service Area Demands



One result of the retailer and planning agency coordination is that it showed retailers used different land use planning assumptions in their demand models. Many derive their growth projections directly from population projections in city land use plans and others use ABAG projections, and some use a model with a combination of local plans and known or historic growth considerations. Very few retailers showed their projected demands by water use sectors as was done in the District's demand study. The exercise was useful in that it provided the District

with more understanding about the differences between the District's and retailers underlying assumptions. Additional details of the District's coordination efforts are documented in Appendix D.

The District refers the reader to the water retailer UWMPs for their most recent demand projections, modeling efforts and assumptions. The retailer projections provided to the District before April 28, 2016 are shown in Table 4-1.

4.3.2 Regional Planning Coordination

Prior to receiving the individual water retailers' demand projections, the District used regional growth projections in an effort to estimate countywide and smaller service area demands as background information for planning. However, the demands developed in this exercise are not used in this UWMP to project the individual water retailer demands for their service areas. Rather, it is used as a comparative guide to other land use scenarios that could affect growth or demand differently than city general plans.

Developing demand projections based on ABAG data is useful to better understand how the regional planning scenarios in ABAG's Plan Bay Area 2013 would potentially affect countywide and service area water demands, if Plan Bay Area growth in population and jobs were realized. Plan Bay Area also incorporates local and regional planning assumptions for population, housing, jobs and transportation.

For this effort, the District used ABAG projections from 2013 Plan Bay Area, which is a long-range regional transportation and land-use blueprint. Base year water demand was based on data from the water retailers' 2013 monthly billing and sales data (a pre-drought restrictions demand year). The ABAG growth sectors, US Census data on population and housing types, and retailer water use sectors where matched to create baseline datasets for each of the water retailer billing sectors in each service area. The IWRMain water demand model used the growth projections from Plan Bay Area for each sector to project future water use demand for that sector.

The District also conferred with South County land use planning documents, local County agricultural documents and the Santa Clara County Agricultural Commissioner in developing water use demand assumptions for the agricultural water use sector.

Additional efforts to further the District's understanding of water retailer and land use planning agency assumptions are presented in more detail below.

4.3.3 Planning Agency Coordination

Even though there was close alignment between the overall District demands projections and retailer demands, the District wanted to ensure that the underlying planning assumptions were well understood for each of the service areas. The District conducted efforts to consider relevant general plan and housing element information by either consulting directly with the retailers and planning staff or reviewing available planning documents. Where appropriate, planning staff were included in the discussions with retailers, or staff reviewed general plans and ABAG projections prior to meeting with the retailers. In some cases, the coordination with planning staff was done separately due to situations where city boundaries and retailer service areas do not coincide. This coordination effort is ongoing at the time of the preparation of the final draft of this UWMP, but when complete the District will be able to document the basis for growth utilized in the retailers' demand projections, what general plan or new developments were considered in the growth projection, and whether ABAG's listed Priority Development Areas were considered. The amount of coordination and document review conducted for each service area was different based on need and availability of documents and staff availability. The details of this effort and the retailers' demand projections are provided in Appendix D: Water Demand and Agency Coordination Documentation.

4.3.4 Assumptions and Considerations For Long Term Demand Projections

No one planning framework or model can be a predictor of the future, including future water supply, demand, demographics, or hydrology. As articulated by George E. P. Box in Empirical Model-Building and Response Surfaces (1987):

> *"Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful."* p. 74. And, *"Essentially, all models are wrong, but some are useful."* p. 424

This is one reason why the District attempted to be inclusive of more than one specific modeling or planning environment, and attempted to coordinate with others and document planning assumptions. All this work may not lead to a more correct outcome, but can help to inform planners and decision makers of limitations on the information. This information can also inform decision makers about what projections may be more realistic than others, since no one projection or plan is likely to be 'right'. Lastly, the District will take all of this information to develop a range of scenarios to consider in the long-term water supply planning process. The District has been using scenario, portfolio development, and risk based planning tools since the 1990s.

The District also recognizes that the near term and potentially long term water demand may be considerably affected by the recent and unprecedented statewide drought conditions of 2012 to 2016. This event has already affected demand as the public has changed attitudes and as water use restrictions have been put in place. Some of the water use efficiency successes and changed behavior will last into the future. But if the past is a guide, we also realize that some rebound of water use will likely occur within a few years of removing water use restrictions. This drought and the local and statewide efforts to date may likely lead to new policy or technological enhancements that may reduce future demands in ways that cannot be currently predicted. The District is watching and participating in local and statewide forums in which future changes are already being considered. For instance, it is quite likely that the State will continue its mandates for water use efficiency and may call for a statewide 2030 target, similar to the 20% by 2020 regulation of SBx7-7. Also, the District is participating on a local effort to develop a Model Ordinance for New Development that may require further innovations in water use efficiency and alternative water sources.

There is also the possibility of the convergence of drought conditions and regional growth. Certainly, businesses and residents will make future decisions based on economic and environmental sustainability of a region that could also affect growth in ways that cannot be accurately anticipated. Climate change also plays a role in the prospects for the future. In one way, climate change may cause long term or seasonal increases in demand. Conversely, as regions prepare for climate change, the way land and water are used and developed may also change that could result in reduced demand.

Since the District recognizes the limitations associated with demand projections, it will continue to coordinate with the water retailers and land use agencies (and regional and statewide efforts) to better understand a future for which to plan for. Following adoption of this 2015 UWMP, the District will continue its long term planning work as it updates its Water Supply and Infrastructure Master Plan (Water Master Plan). The Water Master Plan presents the District strategy for ensuring a reliable future water supply in an efficient and effective manner. The plan is reviewed annually and updated every five years. This allows the District to adjust to changing conditions and protect against over or under investing in our future water supply as conditions and assumptions change.

4.4 Climate Change

Climate change is expected to have an effect on future water demands. Outdoor irrigation generally increases in warmer and drier periods, and in this region increased temperatures are expected. Drought may also increase in

frequency, severity, and duration. However, since hydrology is already highly variable in the region and droughts are common, it is not feasible to quantify the expected increases. In addition, there are other effects, such as economy and changes in water use, on demand, so it is difficult to quantify the direct impact of climate on future year demands. However, all else being equal, water demand would be expected to increase in a warmer and drier future. The District will continue to monitor the state of the science of climate change and the potential impacts. As more is known, the District's planning assumptions will continue to be updated.

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Chapter 5 – Baselines and Targets

The State set a goal of reducing urban water use by 20 percent with the adoption of the Water Conservation Act of 2009, also known as SB X7-7. Each retail urban water supplier must determine baseline water use during their baseline period and also target water use for the years 2015 and 2020 in order to help the State achieve the 20 percent reduction. The District has been very involved in this effort, including participating on the Urban Stakeholder Committee, meeting directly with local water retailers, offering technical and regional alliance support, and in reviewing and proposing policies that support ways to meet the targets.

5.1 Support To Retailers

Wholesale water suppliers such as the District, are not required to establish and meet baseline and targets for daily per capita water use. However, wholesale agencies are required to provide an assessment of their present and proposed future measures, programs and policies that will help the retail water suppliers in their wholesale service area achieve their SB X7-7 water use reduction targets. This chapter describes the various ways the District is involved and supportive.

5.1.1 Water Conservation Programs

The District has been and continues to be a leader in water conservation with innovative, effective, and comprehensive-in-scope programs. This is consistent with Board Ends Policy E-2.1.5, which states the following: "maximize water use efficiency, water conservation and demand management opportunities." As one of the initial signatories to the California Urban Water Conservation Council's (CUWCC) 1991 Memorandum of Understanding Regarding Urban Water Conservation Best Management Practices (MOU), the District is firmly committed to the implementation of the Best Management Practices (BMPs) or Demand Management Measures (DMMs). The District and its major water retailers enjoy a special cooperative partnership in the regional implementation of a variety of water conservation programs in an effort to permanently reduce water use in Santa Clara County. Please see Chapter 9: Demand Management Measures for more detail on how the District supports the water retailers with these programs.

5.1.2 Water Retailer Assistance

The District meets regularly with the local water retailers to provide information, offer technical support, and assist with development of regional alliances.

5.1.3 Policy Development

The District has been instrumental in recent collaborative efforts related to policy to assist the retailers in meeting the SB X7-7 targets. One example is a recent effort to develop a model ordinance for Water Efficient New Developments. District, water retailer, and city/county planning staff have been meeting regularly in 2015 and 2016 to develop a model ordinance that the cities and county can adopt in their jurisdiction. Adoption of the model ordinance sets the bar higher than what is required by State law in terms of water use efficiency for new residential and commercial developments.

The District has also supported and sponsored legislative efforts like the recent legislation on irrigation standards (AB 1928, 2016).

5.1.4 Alternative Methods To Meet Targets

A small but growing source of water for Santa Clara County is recycled water. Using recycled water helps reduce potable water demands; provides a dependable, drought-proof, locally-controlled water supply; and reduces reliance on imported water. Recycled water is currently about 5 percent (or about 20,000 AFY) of the county's

supply and is distributed for non-potable uses such as landscape and agricultural irrigation, industrial cooling, and dual plumbed facilities.

The District is currently in the process of developing a countywide recycled water master plan that will outline an approach to achieving its target that recycled water, including both non-potable and potable reuse, is 10 percent of the county's water supply by 2025. Please see Chapter 6: System Supplies for more information on the District's recycled water efforts.

Chapter 6 – System Supplies

This chapter describes current and future sources of water available to Santa Clara County, including sources of water specific to the District. Sources of supply for the District include natural groundwater recharge, local surface water, imported surface water from the State Water Project (SWP) and Central Valley Project (CVP), recycled and purified water, and transfers. In addition, the San Francisco Public Utilities Commission delivers water to eight retailers in the northern part of Santa Clara County, San Jose Water Company and Stanford have local surface water rights, and retailers deliver recycled water to customers throughout the county. Potable reuse (groundwater recharge with purified recycled water) is a planned future water supply source for the District. Current and projected water supply yields are presented in Table 6-5 and Table 6-6, respectively. The projected water supply yields are based on implementing the District's 2012 Water Supply and Infrastructure Master Plan (Water Master Plan) in Appendix F. The chapter ends with a brief summary of climate change vulnerabilities and how the District plans to address various challenges to water supply reliability.

6.1 Groundwater

The District does not typically deliver groundwater to customers, but does have some limited emergency groundwater pumping capacity. Instead, it manages the groundwater subbasins for the benefit of its groundwater customers and the county at large. The District's water supply strategy since the 1930s has been to maximize conjunctive use, the coordinated management of surface and groundwater supplies, to enhance water supply reliability and avoid land subsidence. Local groundwater resources make up the foundation of the county's water supply, but they need to be augmented by the District's comprehensive water management activities in order to reliably meet the needs of county residents, businesses, agriculture, and the environment. These activities include managed recharge of imported and local supplies and in-lieu groundwater recharge through the provision of treated surface water and raw water, acquisition of supplemental water supplies, and water conservation and recycling.

6.1.1 Groundwater Basin Description

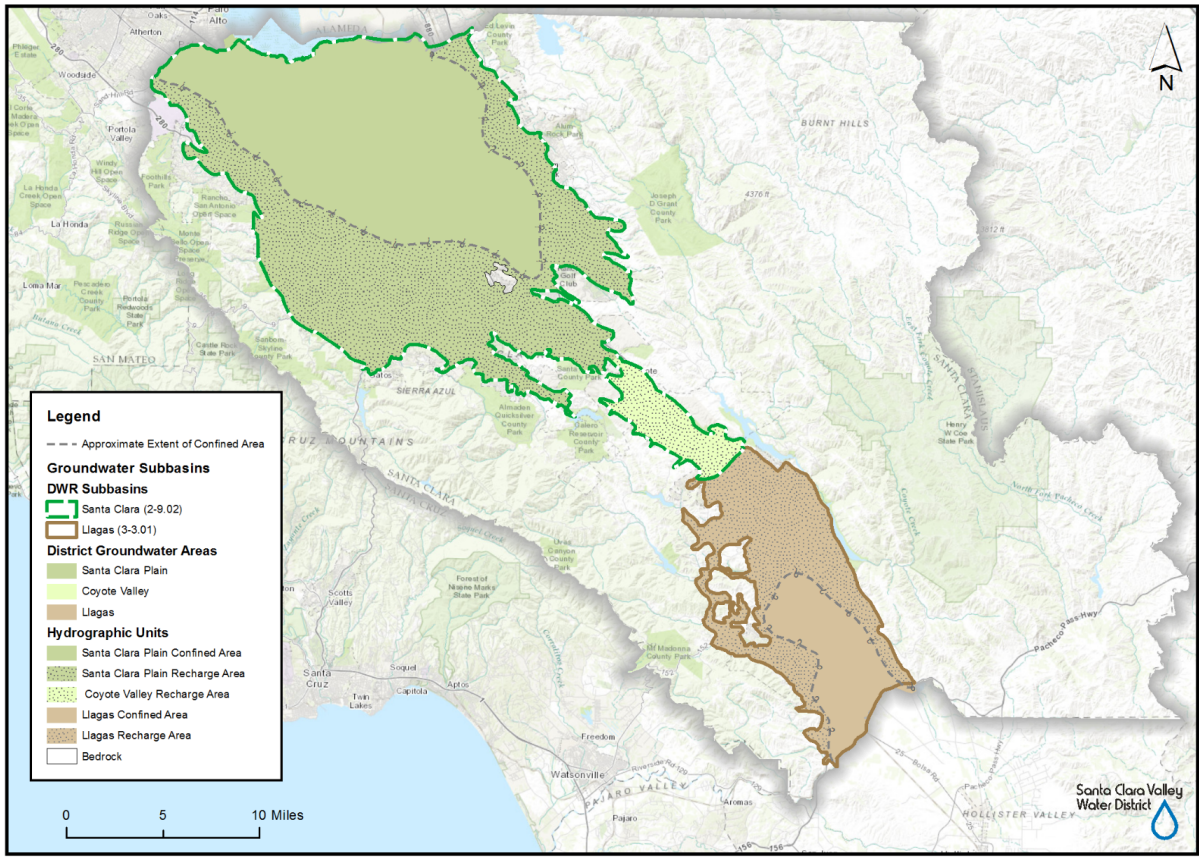
Santa Clara County includes portions of two groundwater basins as defined by the California Department of Water Resources (DWR)[1] : the Santa Clara Valley Basin (Basin 2-9) and the Gilroy-Hollister Valley Basin (Basin 3-3). The two groundwater subbasins within Santa Clara County managed by the District are the Santa Clara Subbasin (Subbasin 2-9.02) and the Llagas Subbasin (Subbasin 3-3.01), which cover a surface area of approximately 385 square miles. Due to different land use and management characteristics, the District further delineates the Santa Clara Subbasin into two groundwater management areas: the Santa Clara Plain and the Coyote Valley. The groundwater subbasins are shown in Figure 6-1.

The groundwater subbasins provide multiple benefits to residents and businesses in Santa Clara County. Although most of the groundwater pumped is a result of District managed recharge programs, the subbasins provide some groundwater supply resulting from the percolation of rainfall in the recharge areas and natural seepage through local creeks and streams (natural groundwater recharge in the supply project). In addition, the groundwater subbasins serve as an extensive conveyance network, allowing water to move from the recharge areas to individual groundwater wells. The groundwater subbasins also provide some natural filtration of surface water as it percolates through the soil and rock. Unlike surface water, most groundwater in the county can be used for drinking water without additional treatment. Lastly, the groundwater subbasins provide water storage, allowing water to be carried over from the wet season to the dry season and even from wet years to dry years.

[1] California Department of Water Resources, Bulletin 118, 2003.

The estimated operational storage capacity of the groundwater subbasins is up to 548,000 AF. The District's managed recharge capacity is up to about 144,000 AFY.

Figure 6-1. Santa Clara County Groundwater



6.1.2 Groundwater Management Plan

The District's Groundwater Management Plan[2] (included in Appendix G) identifies the following two basin management objectives (BMO):

- BMO 1: Groundwater supplies are managed to optimize water supply reliability and minimize land subsidence.
- BMO 2: Groundwater is protected from existing and potential contamination, including salt water intrusion.

These BMOs describe the overall goals of the District's groundwater management program. The basin management strategies are the methods that will be used to meet the BMOs. Many of these strategies have overlapping benefits to groundwater resources, acting to improve water supply reliability, minimize subsidence, and protect or improve groundwater quality. The strategies are listed below.

1. Manage groundwater in conjunction with surface water through direct and in-lieu recharge programs to sustain groundwater supplies and to minimize salt water intrusion and land subsidence.
2. Implement programs to protect or promote groundwater quality to support beneficial uses.
3. Maintain and develop adequate groundwater models and monitoring systems.

[2] http://www.valleywater.org/Services/Groundwater.aspx

4. Work with regulatory and land use agencies to protect recharge areas, promote natural recharge, and prevent groundwater contamination.

The District and local partners have implemented numerous programs to protect groundwater resources and the District has established comprehensive monitoring programs related to groundwater levels, land subsidence, groundwater quality, recharge water quality, and surface water flow. In addition, the District has developed the following outcome measures to gauge performance in meeting the basin management objectives:

1. Projected end of year groundwater storage is greater than 278,000 AF in the Santa Clara Plain, 5,000 AF in Coyote Valley, and 17,000 AF in the Llagas Subbasin.
2. Groundwater levels are above subsidence thresholds at the subsidence index wells.
3. At least 95% of countywide water supply wells meet primary drinking water standards and at least 90% of South County wells meet Basin Plan agricultural objectives.
4. At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids (TDS).

The District plans to update its Groundwater Management Plan in 2016 to meet the requirements of the Sustainable Groundwater Management Act of 2014.

6.1.3 Current Conditions

DWR has identified the Santa Clara Subbasin as a medium-priority subbasin and the Llagas Subbasin as a high-priority subbasin based on criteria that include overlying population, projected growth, number of wells, irrigation acreage, groundwater reliance, and groundwater impacts. Neither subbasin has been identified as being in overdraft.

The District monitors water levels and water quality at wells throughout the county. In addition, it evaluates data from local water suppliers to assess regional groundwater quality and identify potential threats so they can be appropriately addressed. The District also monitors the quality of water used for groundwater recharge to ensure groundwater resources are protected. Groundwater conditions throughout the county are generally good. Although groundwater levels have declined during the recent drought, groundwater levels in most areas have begun to improve.

Most wells in Santa Clara County produce high-quality water that meets drinking water standards without the need for treatment. The primary exception is nitrate, which is elevated in a number of South County wells and continues to be a groundwater quality challenge. Cleanup is ongoing at a number of sites with industrial contaminants in groundwater, and elevated levels of perchlorate are still observed in some South County wells. The District is working with other agencies, basin stakeholders, and the public to address these issues and ensure groundwater quality remains high.

The District's groundwater monitoring reports are available at http://www.valleywater.org/Services/GroundwaterMonitoring.aspx.

6.1.4 Natural Groundwater Recharge Supply Projection

The District includes natural groundwater recharge as a source of supply for long-term water supply planning purposes because it contributes to the available groundwater supply. Natural recharge includes all uncontrolled recharge, including the deep percolation of rainfall, septic system and/or irrigation return flows, and natural seepage through creeks. Based on estimates from the District's groundwater flow and Water Evaluation and Planning (WEAP) models, future average natural groundwater recharge is projected to be fairly constant over the planning horizon.

6.2 Local Surface Water

The District currently has 20 appropriative water rights licenses and 1 filed water right permit with the State Water Resources Control Board totaling over 227,300 AFY. Local rainfall runoff is captured in the District's reservoirs. This supply is sent to drinking water treatment plants or diverted downstream for groundwater recharge. The total storage capacity of the District's reservoirs is about 169,000 acre-feet, though several are operating at restricted capacity due to seismic stability concerns. Table 6-1 summarizes reservoir capacities, restrictions, and impacts from restrictions.

Table 6-1. Reservoir Capacities, Restrictions, and Water Supply Impacts from Restrictions

Reservoir/ Dam	Reservoir capacity (Acre-feet)	Restricted capacity (Acre-feet)	Restricted capacity (%)	Reason for restriction	Estimated average annual water supply impact (Acre-feet)[3]
Anderson	90,373	61,810	68	Seismic stability concern	10,500
Coyote	23,244	12,382	53	Active fault movement (Calaveras fault) under dam	2,400
Almaden	1,586	1,472	93	Seismic stability concern	2,500
Calero	9,934	4,585	46	Seismic stability concern	
Guadalupe	3,415	2,218	65	Seismic stability concern	800
Stevens Creek	3,138	No restriction	N/A	N/A	N/A
Lexington	19,044	No restriction	N/A	N/A	N/A
Chesbro	7,945	No restriction	N/A	N/A	N/A
Uvas	9,835	No restriction	N/A	N/A	N/A
Vasona	495	No restriction	N/A	N/A	N/A
TOTALS	**169,009**	**122,924**			**16,200**

Most of the reservoirs are sized for annual operations, storing water in winter for use in summer and fall. The exception is the Anderson-Coyote reservoir system, which provides valuable carryover of supplies from year to year.

[3] The estimated average annual water supply impact is the amount of additional water that could have been used for recharge and treatment plant supply if the storage capacity was not restricted. Impacts in individual years will depend on the runoff for that year. If there is little runoff, then there would be little or no impact due to the restricted capacity.

In addition, San Jose Water Company and Stanford University have surface water rights that contribute to local surface water availability to their in-county customers.

6.2.1 Local Surface Water Supply Projection

Future average local surface water supply is projected to increase, based on Water Evaluation and Planning (WEAP) modeling, over the planning horizon as dam improvements are made and operating capacity restrictions can be lifted. As demands increase, the District's ability to utilize excess wet period surface water supplies will also increase.

6.2.2 Constraints on Local Surface Water Supplies

Local surface water supplies are vulnerable to hydrologic variability, with most reservoirs sized for annual operations. In wetter years, the District is challenged to capture all available supply due to capacity constraints and flood protection needs. In drier years, the District is challenged to maintain its groundwater recharge program due to regulations and permit conditions that require the District to maintain bypass flows in the streams.

Several factors can impact the District's reservoir operations and its use of surface water rights, including meeting reservoir operating rules designed to reduce flood risk, maintaining storage levels for environmental or recreation purposes, dam safety requirements, and managing total District supplies for reliability.

In 1996, a water rights complaint was filed at the State Water Resources Control Board (SWRCB) indicating that District water supply operations on Coyote Creek, Guadalupe River, and Stevens Creek impact steelhead trout and Chinook salmon. In 1997, the Central California Coast Steelhead was listed as a threatened species under Federal Endangered Species Act. To address the complaint and ESA issues, the District, Guadalupe – Coyote Resource Conservation District (GCRCD), Trout Unlimited, the California Department of Fish and Wildlife (CDFW), U. S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS), participated in the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) to develop a Settlement Agreement. The Settlement Agreement was initialed in 2003. A key Settlement Agreement provision is the Fish Habitat Restoration Plan (Restoration Plan), which proposes changes in reservoir releases to support instream flow needs for salmonids, channel enhancements, monitoring and adaptive management, in addition to several fish habitat improvements already completed as early FAHCE implementation.

6.3 Recycled and Purified Water

A growing source of water supply for Santa Clara County is recycled and purified water. Using recycled water helps augment drinking water and groundwater supplies through in-lieu recharge; provides a reliable, drought-proof, locally-controlled water supply; and reduces reliance on imported water. Recycled water is currently about 5 percent (or about 20,000 AFY) of the county's supply and is distributed for non-potable uses such as landscape and agricultural irrigation, industrial cooling, and dual plumbed facilities. This recycled water is produced at the four wastewater plants in the county – Palo Alto, Sunnyvale, San Jose/Santa Clara, and South County Regional Wastewater Authority (SCRWA). In addition, the District is in the process of developing at least 20,000 AFY and up to 45,000 AFY of potable reuse capacity. The District is currently in the process of developing a countywide recycled and purified water master plan that will outline its approach to achieving its target - that recycled water, including both non-potable and potable reuse, is 10 percent of the county's water supply by 2025.

6.3.1 Non-Potable Reuse

The City of San José operates the South Bay Water Recycling (SBWR) system and distributes recycled water generated by the San José/Santa Clara Regional Wastewater Facility. Some of this water is being supplied to the District's adjacent Silicon Valley Advanced Water Purification Center, which in turn purifies the water with advanced technologies and blends it with tertiary treated water to create high quality recycled water that can be

used by a wider variety of customers. Since March 2014, the purification center has been demonstrating the effectiveness of the advanced treatment technologies (microfiltration, reverse osmosis, and advanced oxidation) and setting the stage for the District to begin a potable reuse program. Potable reuse involves using purified water to augment groundwater or surface water supplies. The SBWR Strategic and Master Plan (Strategic Plan), which discusses non-potable and potable reuse opportunities, is available at http://www.valleywater.org/Services/RecycledWater.aspx.

In South County, the District partners with the SCRWA, City of Gilroy, and City of Morgan Hill on the recycled water program. Consistent with existing agreements, SCRWA is the recycled water producer, the District is the wholesaler, and Gilroy and Morgan Hill are the retailers (though recycled water is not currently delivered to Morgan Hill). The Draft 2015 South County Recycled Water Master Plan Update is available at http://www.valleywater.org/Services/RecycledWater.aspx.

The District is a partner with the City of Sunnyvale on the Wolfe Road Recycled Water Facilities Project, which is scheduled for construction in 2016, and is considering other partnership agreements. The District is also working with the cities of Palo Alto and Mountain View on additional recycled water options within those cities.

6.3.2 Potable Reuse

The District's Water Master Plan includes developing 20,200 AFY of potable reuse capacity. The current plan is that water would be purified at an expanded purification center in Alviso, piped to the District's Los Gatos Recharge System, and used for groundwater recharge. The District's Expedited Purified Water Program is currently evaluating an expanded and expedited potable reuse program that could include up to a total of 45,000 AFY of potable reuse capacity.

6.3.3 Past Recycled Water Supply Projection

The District's 2010 UWMP projected 2015 non-potable recycled water use to be 18,680 AF and to increase to 29,180 AF in 2030. Actual 2015 non-potable recycled water use was over 20,000 AF and the current projection for 2030 is 31,900 AFY.

6.3.4 Recycled Water Supply Projection

The non-potable recycled water supply projection in Table 6-2 is based on recycled water use estimates provided by the water retailers and increases over the planning horizon.

The District's baseline potable reuse program of 20,200 AFY of capacity for groundwater recharge is scheduled to be on-line before 2025. Based on water supply system modeling, the program will operate at full capacity in dry years, but not in wetter years or when groundwater levels are high. Average use will increase over time as demands on the groundwater subbasins increase. Additional capacity may be developed in future phases depending on water supply needs, new regulations providing for direct potable reuse, and reverse osmosis concentrate disposal capacity.

6.3.5 Constraints on Recycled Water Supplies

The SBWR retailer projections for recycled water use exceed the amount projected in the SBWR Strategic Plan. The Strategic Plan includes 15,000 AFY of retail recycled water deliveries, plus 5,600 AFY of recycled water reserved for District use. The constraints on SBWR deliveries to retailers include infrastructure capacity and the availability of recycled water (depending on the amount of potable reuse capacity the District develops). The District is including all the retailer projections in this analysis, because the amount of influent to the SBWR system is sufficient to meet the combined non-potable retailer demands and the assumed potable reuse demand, or a total of about 45,900 AFY. As the District makes decisions regarding its potable reuse program, it will update the recycled water projections as needed.

Table 6-2. Non-Potable Recycled Water Supply Projection (AF)

Service Area	2020	2025	2030	2035	2040
South Bay Water Recycling					
Milpitas	2,500	2,700	2,900	3,100	3,100
San Jose Muni	5,600	6,200	6,800	7,400	7,400
San Jose Water Company	4,100	6,900	8,400	8,400	8,400
Santa Clara	4,700	5,700	6,100	6,500	6,900
Sunnyvale Water Pollution Control Plant					
California Water Service Company	500	500	500	500	500
Sunnyvale	1,500	1,600	1,700	1,700	1,700
Palo Alto Regional Water Quality Control Plant					
Mountain View	1,000	1,100	1,100	1,100	1,100
Palo Alto	900	900	900	900	900
South County Regional Wastewater Authority					
Gilroy	2,600	3,200	3,700	3,700	3,700
Total[4]	**23,300**	**28,500**	**31,900**	**33,100**	**33,500**

Some of the potential constraints on development of potable reuse include brine disposal, public acceptance, permitting, hydrogeologic conditions, and costs. Once the program is implemented the largest challenge will be maximizing use of the available supply during wetter years when storage is full and/or other lower cost supplies are competing for use. These constraints are being addressed as part of the Expedited Purified Water Program.

6.4 Imported Water

District imported water is conveyed through the Sacramento-San Joaquin Delta and then pumped and delivered to the county through the South Bay Aqueduct, which carries water from the State Water Project (SWP), and through the San Felipe Division, which brings in water from the federal Central Valley Project (CVP).

The District has a contract for 100,000 acre-feet per year (AFY) from the SWP and a contract for 152,500 AFY from the CVP. The actual amount of water delivered is typically less than these contractual amounts and depends on hydrology, conveyance limitations, and environmental regulations. Supplemental imported water is acquired through transfers and exchanges as needed and available. In addition, the District is able to put some imported water supplies into carryover and Semitropic Groundwater Bank for later withdrawal and use. Imported supplies are delivered to the District's three drinking water treatment plants, groundwater recharge facilities, and raw water irrigation customers.

Eight retailers in the county have contracts with the San Francisco Public Utilities Commission (SFPUC) to receive water from the SFPUC Regional Water System. The eight retailers, considered to be wholesale customers of SFPUC, are the cities of Palo Alto, Mountain View, Sunnyvale, Santa Clara, San José, and Milpitas; Purissima Hills Water District; and Stanford University. In addition, NASA-Ames is considered a retail customer of SFPUC. The District does not control or administer SFPUC supplies in the county, but the supply reduces the demands on District sources of supply.

[4] The total does not match due to rounding.

6.4.1 Imported Water Supply Projections

Future average imported water supply is projected to slightly increase. The District's CVP supply is anticipated to increase modestly after 2022 when the Water Reallocation Agreement with the San Luis and Delta-Mendota Water Authority and United States Bureau of Reclamation expires. After then, CVP and SWP supplies are projected to remain fairly constant, though future conditions could change this projection as discussed below. SFPUC supplies are projected to increase modestly as retailers increase their use of this source of supply.

The SFPUC normal year supply projection in Table 6-3 is based on projections by SFPUC wholesale customers, either through reports to the District or the Bay Area Water Supply and Conservation Agency (BAWSCA). These projections do not take into account potential decreases in supply allocations by the SFPUC during dry years. The total supply projection increases modestly through the planning horizon and remains below the sum of Individual Supply Guarantees for the county.

Table 6-3. Projected SFPUC Normal Year Supplies (AF)

Service Area	2020	2025	2030	2035	2040
Milpitas	10,300	10,300	10,300	10,300	10,300
Mountain View	9,600	9,700	10,000	10,300	10,600
Palo Alto	11,100	10,800	10,500	10,300	10,100
Purissima Hills	2,100	2,100	2,100	2,100	2,100
San Jose Muni	5,000	5,000	5,000	5,000	5,000
Santa Clara	5,000	5,000	5,000	5,000	5,000
Stanford	2,100	2,400	2,500	2,700	3,000
Sunnyvale	11,100	12,300	12,300	12,300	12,300
Total	**56,400**	**57,600**	**57,800**	**58,000**	**58,500**

SWP and CVP allocations are based on the "State Water Project Delivery Capability Report 2015." DWR prepares a biennial report to assist SWP contractors and local planners in assessing the near and long-term availability of supplies from the SWP. DWR issued its most recent update, the 2015 DWR State Water Project Delivery Capability Report (DCR), in July 2015. In the 2015 update, DWR provides SWP supply estimates for SWP contractors to use in their planning efforts, including for use in their 2015 UWMPs. The 2015 DCR includes DWR's estimates of SWP and CVP water supply availability under both current and future conditions.

DWR's estimates of SWP and CVP deliveries are based on a computer model that simulates monthly operations of both systems. Key assumptions and inputs to the model include the system facilities, hydrologic inflows to the system, regulatory and operational constraints on system operations, and projected contractor demands for water. For example, the 2015 DCR uses the following assumptions to model current conditions: existing facilities, hydrologic inflows to the model based on 82 years of historical inflows (1922 through 2003), current regulatory and operational constraints, and SWP contractor demands at maximum Table A amounts[5].

To evaluate SWP supply availability under future conditions, the 2015 DCR included four model studies. The first of the future-conditions studies, the Early Long Term (ELT) scenario, used all of the same model assumptions for current conditions, but reflected changes expected to occur from climate change, specifically, a 2025 emission level and a 15 cm sea level rise. The other three future-conditions include varying model assumptions related to the Bay

[5] Table A amounts: Table A amounts are the annual amounts of SWP supplies that the State makes available to the District, subject to hydrologic and regulatory constraints. The District's maximum Table A quantity is 100,000 AF.

Delta Conservation Plan/California Water Fix ("BDCP"), such as changes to facilities and/or regulatory and operational constraints.

In spring 2015, DWR announced that BDCP would move from a Section 10 permit to a Section 7 permit process under the Federal Endangered Species Act and split the project into two distinct parts known as Cal WaterFix (Alternative 4A), the conveyance portion, and Cal EcoRestore, the restoration portion. Cal WaterFix is Alternative 4A in the recirculated environmental document, and the preferred alternative. Alternative 4A is different than any of the future scenarios modeled by DWR in the DCR and would likely increase projected water deliveries compared to the ELT scenario. Environmental review of the Cal WaterFix is ongoing and several regulatory and legal requirements must be met prior to construction. Therefore, this UWMP modeling does not assume implementation of the California WaterFix.

This UWMP uses the ELT scenario to estimate future SWP and CVP supply availability because it is based on existing facilities and regulatory constraints, with hydrology adjusted for the expected effects of climate change. This scenario is consistent with the studies DWR has used in its previous SWP Delivery Reliability Reports for supply availability under future conditions. The assumptions regarding future SWP and CVP supply availability will be updated when there is more certainty regarding future infrastructure, operations, and regulations.

6.4.2 Constraints on Imported Water Supplies

Imported water supplies are subject to hydrologic variability. Local and out-of-county storage can help mitigate the impacts of hydrologic variability, as does the development of all-weather supplies.

The District's SWP and CVP water supplies are also subject to a number of additional constraints including regulatory constraints to protect fisheries and water quality in the Delta, and conveyance limitations. Delta supplies are also challenged with, seismic threats to the levee system, sea level rise and climate change, declining populations of protected fish species, and water quality variations (including algal blooms). Water quality variations are addressed at the drinking water treatment plants, by blending sources, and/or switching sources. Algae and disinfection byproduct precursors have been especially challenging during recent drought conditions. In addition to developing local supplies, securing and optimizing the District's existing local water system, and expanding water conservation, the District is evaluating the costs and benefits of participating in the California WaterFix. Preliminary analyses indicate that the WaterFix project has the potential to improve the reliability and quality of the District's Delta supplies. The District continues to evaluate the benefits and costs of the project relative to other water supply options.

The Cities of San Jose and Santa Clara are temporary and interruptible customers of the SFPUC. The SFPUC is scheduled to decide whether to make them permanent customers by December 31, 2018. If San Jose and Santa Clara SFPUC supplies are interrupted, the cities could need to increase their use of District supplies.

6.5 Transfers

The District's Water Master Plan includes dry year options/transfers in critical dry years. Consequently, this UWMP assumes 6,000 AF of transfers in critical dry years in the 2020 demand year and 12,000 AF of transfers in critical years in subsequent demand years. As a reference, the District was able to secure over 20,000 AF of transfer supply in 2015. However, during prolonged droughts, transfer supplies may be limited and costly, while water quality challenges and pumping restrictions affect the ability to convey transfer supplies across the Delta.

6.6 Reserves

Reserves include local groundwater storage, Semitropic Groundwater Bank, and carryover. The District puts water into reserves when other supplies exceed demands and takes water out of reserves when other supplies are less

than demands. Within a single year, the District may both put water into and take water out of reserves, depending on conditions at the time of year. Reserves play a critical role in the District's overall water management strategy and its ability to meet demands during droughts.

One constraint on using local groundwater storage reserves is the need to maintain adequate groundwater levels to avoid land subsidence, keep water levels from dropping below existing wells, and maintaining some reserve in case the subsequent year is dry. The use of local water carryover can be constrained by regulations governing instream flow requirements. Another constraint on reserves is finite storage capacity. In very wet years, the District may be challenged to find a place to use or store all of its available supplies.

6.7 Desalination

The District is a partner in the Bay Area Regional Desalination Project, which found that the Regional Desalination Project in eastern Contra Costa County could produce up to 22,400 AFY. Under the project concept, the District would receive 5,600 AF in critical dry years through exchanges with other agencies. While each of the participating agencies continues to evaluate its need for the project, the agencies are collectively embarking on a study (the Bay Area Regional Reliability Project or BARR Project) to look more broadly at all the available opportunities to optimize the sharing of water resources across the region. In this context, the agencies will consider the use of existing supplies as well as new supply through desalination. By taking a more holistic and regional approach to water supply planning, the agencies hope to make the best use of scarce resources to serve the future needs of the Bay Area. More information on the regional desalination project is available at http://www.regionaldesal.com/. At this time, the District is not including desalination in its projected water supplies.

6.8 Stormwater

The District's managed recharge program includes capturing local runoff in reservoirs and releasing it to groundwater recharge facilities or drinking water treatment plants. About 50,000 AFY of local runoff/stormwater is recharged through existing recharge facilities on average. The District plans to increase local stormwater runoff reuse capacity through the construction of additional recharge ponds. In addition, as part of its One Water Plan scheduled for completion in 2016, the District will explore additional opportunities for stormwater capture and reuse in conjunction with its flood protection and stream stewardship projects.

The District is planning to develop a Storm Water Resource Plan (SWRP) in partnership with the Santa Clara Valley Urban Runoff Pollution Prevention Program. The SWRP may also identify stormwater capture and reuse opportunities that the District can incorporate into future updates of its Water Master Plan.

6.9 Future Water Supply Projects

The District is in the process of planning, designing, and constructing a number of projects and programs that will increase water supply. These projects are summarized in Table 6-4. The estimated yields are included in the supply projections in Table 6-6.

Table 6-4. Future Water Supply Projects

Project	Planned Operating Year	Expected Increase in Water Supply (AFY)
Dam Improvements/Seismic Retrofits	2022	13,800
Main and Madrone Pipelines Restoration	2019	600
Potable Reuse Program	2021	20,200
South County Recycled Water Program	2020	1,700
Wolfe Road Recycled Water Pipeline	2017	600

6.10 Current and Projected Water Supplies

2015 water supplies are presented in Table 6-5. These are based on the values in Figure 3-5.

Table 6-5. 2015 Water Supplies

Supply	2015 (AF)
Natural Groundwater Recharge	39,000
Local Surface Water	43,000
Recycled Water	21,000
San Francisco Public Utilities Commission	42,000
CVP and SWP Allocations	60,000
Carryover, Transfers, and Semitropic Takes	55,000
Sum	**260,000**

Table 6-6 presents projected normal or average water supplies through 2040. The analysis uses the average of natural groundwater recharge, local surface water, and CVP and SWP Allocations over 94-years of modeled hydrology (1922 – 2015). The averages are used for these supplies because their availability varies greatly from year to year and there is not a single year that is comparable to average conditions. The availability of recycled water and potable reuse supplies does not vary year to year. The availability of SFPUC supplies decreases in some dry years and droughts, but in most years the amount available is the same as listed in Table 6-3. Further water supply reliability analysis, including supplies in single and multiple dry years, is presented in Chapter 7.

Table 6-6. Projected Average Water Supplies (AF)

Supply	2020	2025	2030	2035	2040
Natural Groundwater Recharge	60,900	60,900	60,900	60,900	61,000
Local Surface Water	78,600	85,600	89,700	92,400	93,400
Recycled Water	23,300	28,500	31,900	33,100	33,500
Potable Reuse	-	20,200	20,200	20,200	20,200
San Francisco Public Utilities Commission	56,400	57,600	57,800	58,000	58,500
CVP and SWP Allocations	171,000	175,300	175,300	175,300	175,300
Sum	390,200	428,100	435,800	439,900	441,900

6.11 Climate Change Impacts to Water Supply and Water Quality

The District's ability to provide a reliable, clean water supply is challenged by the potential of warmer temperatures, changing precipitation and runoff patterns, reduced snow pack, and rising sea levels. The District's water supply vulnerabilities to climate change include a potential decrease in imported water supplies as a result of a reduction in snow pack and a shift in the timing of runoff, a decrease in local surface water supplies as result of reduced precipitation, more frequent and severe droughts, changes in surface water quality associated with changes in flows and temperature, and changes in imported water quality due to salinity intrusion in the Delta. Additional vulnerabilities include infrastructure and water quality issues from more frequent algal blooms, invasive and/or non-native species, and wildfire.

To address constraints on water supplies and the challenges of an uncertain future and imprecise projections of future conditions and potential impacts on water supplies, the District relies on its long term planning efforts that continually develop and improve resilient and adaptable water supplies and strategies and consider changing and uncertain conditions that adapt well to future climate changes. The District is preparing to update its Water Master Plan in 2017. The plan is reviewed annually and updated every five years to evolve to changing conditions. The 2017 update will build upon the District Board approved strategies to secure and optimize the use of existing supplies and infrastructure and meet future increases in demands with conservation and recycling. The Water Master Plan will continue to develop elements that adapt well to future climate changes.

Chapter 7 – Water Supply Reliability

This chapter describes long-term reliability of the District's water supplies in normal, single dry, and multiple dry years based on the projected demands in Chapter 4 and the projected supplies and constraints in Chapter 6. Short-term supply reliability is discussed in Chapter 8.

7.1 Methodology

The District uses the Water Evaluation and Planning (WEAP) system model to evaluate water supply reliability under different conditions. This water supply modeling tool takes an integrated approach to water resources planning. The WEAP model is used primarily to simulate the District's water supply system comprised of facilities to recharge the county's groundwater subbasins, local water supply systems including the operation of reservoirs and creeks, treatment and distribution facilities, and raw water conveyance systems. The model also accounts for non-District sources and distribution of water in the county such as supplies from the San Francisco Public Utilities Commission, recycled water, and local water developed by other agencies such as San Jose Water Company. In essence, the model was formulated to simulate the management of the current and future water resources within the county. In addition, the District groundwater flow models were used to estimate initial groundwater storage and natural groundwater recharge.

Analyzing projected water supplies and demands requires establishing many assumptions. These modeling assumptions are summarized in Appendix H.

7.2 Supply and Demand Assessment

This section compares supplies and demands on average, in a single dry year, and in a multiple dry year scenario. The reliability scenarios are summarized in Table 7-1. The supplies include existing and planned supplies, infrastructure, and institutional arrangements, as defined in the District's 2012 Water Supply and Infrastructure Master Plan in Appendix F. The increasing quantity of supplies in Table 7-2 is a result of the Water Master Plan implementation over time. The single dry and multiple dry year SFPUC supplies are based on Tier 2 Allocation Scenarios applied to cumulative wholesale Regional Water System allocations provided by SFPUC.

Table 7-1. Reliability Scenarios

Year Type	Base Year	Volume Available (AF)[1]	% of Average Supply[1]
Average	1922-2015	390,200	100%
Single-Dry	1977	370,700	95%
Multiple-Dry Years – 1st Year	2013	370,800	95%
Multiple-Dry Years – 2nd Year	2014	330,900	85%
Multiple-Dry Years – 3rd Year	2015	257,500	65%

7.2.1 Average Year Supply Reliability

Table 7-2 compares projected average annual water supplies (from Table 6-6) with project demand (from Table 4-1) through 2040. Supplies exceed demands in all demand years.

[1] The numbers here are based on supplies anticipated to be available in 2020. Supply availability will vary with the demand year. See Tables 7-2 through 7-5.

Table 7-2. Average Supplies and Demands (AF)

Supplies	2020	2025	2030	2035	2040
Natural Groundwater Recharge	60,900	60,900	60,900	60,900	61,000
Local Surface Water	78,600	85,600	89,700	92,400	93,400
Recycled Water	23,300	28,500	31,900	33,100	33,500
Potable Reuse	-	20,200	20,200	20,200	20,200
SFPUC	56,400	57,600	57,800	58,000	58,500
CVP and SWP Allocations	171,000	175,300	175,300	175,300	175,300
Sum	390,200	428,100	435,800	439,900	441,900
Demands	371,200	391,300	408,600	425,800	435,100
Difference	19,000	36,800	27,200	14,100	6,800

7.2.2 Single Dry Year Supplies and Demands

The single dry year scenario is the modeled hydrology that occurred in 1977. Within the historic record, this was the year with the estimated lowest amount of total supply. Modeled CVP and SWP allocations in the future for the 1977 hydrology are comparable to allocations in 2014 and exceed allocations seen in 2015, but local surface water supplies corresponding to 1977 were lower than in years 2014 and 2015. Table 7-3 shows estimated supplies and demands for years 2020 through 2040.

Table 7-3. Single Dry (1977) Year Supplies and Demands (AF)

Supplies	2020	2025	2030	2035	2040
Natural Groundwater Recharge	47,500	47,500	47,500	47,500	47,500
Local Surface Water	6,000	16,600	18,600	19,100	19,000
Recycled Water	23,300	28,500	31,900	33,100	33,500
Potable Reuse	-	20,200	20,200	20,200	20,200
San Francisco Public Utilities Commission	55,900	57,100	57,200	57,500	57,900
CVP and SWP Allocations	73,600	73,600	73,600	73,600	73,600
Transfers	6,000	12,000	12,000	12,000	12,000
Reserves	158,300	135,400	147,000	162,100	144,800
Sum	370,700	390,800	407,900	425,000	408,500
Demands[2]	370,600	390,800	407,900	425,000	434,300
Difference	0	0	0	0	(25,800)

Supplies, with the use of reserves, appear to be sufficient to meet demands during a single dry year through 2035. This assumes that reserves are at healthy levels at the beginning of the year and that the projects and programs identified in the 2012 Water Supply and Infrastructure Master Plan are implemented. If reserves are low at the beginning of a single dry year, the District might need to call for water use reductions in combination with using reserves. Under 2040 demand conditions, reserves are insufficient at the beginning of the year to meet demands

[2] The demands in Table 7-3 are lower than average because less treated water is being distributed and, therefore, treated water losses are lower.

without overdrawing the groundwater reserves. The District would likely call for a 5 to 10 percent reduction in water use in such a year, consistent with its Water Shortage Contingency Plan.

7.2.3 Multiple Dry Years Supply and Demand

The greatest challenge to water supply reliability is multiple dry years, such as those that occurred in 1987 through 1992 and in 2013 through 2015. Although supply in each year may be greater than in a single dry year, multiple dry year periods deplete reserves. As reserves are depleted, local groundwater storage is drawn down increasing the risk of permanent land subsidence.

The multiple dry year period used in this analysis assumes a repetition of the hydrology that occurred in 2013 through 2015, which is the multiple dry year period with the lowest local surface water runoff and CVP and SWP allocations. Estimated supplies and demands for the period, under different demand years, are shown in Table 7-4.

Table 7-4. Multiple Dry Year (2013 to 2015) Supply and Demand (AF)

		2020	2025[3]	2030	2035	2040
2013	Supply Totals[4]	370,800	391,000	408,200	425,200	434,700
	Demand Totals[5]	370,800	391,000	408,200	425,200	434,700
	Difference	-	-	-	-	-
2014	Supply Totals[4]	330,900	389,300	377,600	363,200	354,900
	Demand Totals[5]	370,600	390,900	407,900	424,800	434,300
	Difference	(39,700)	(1,600)	(30,300)	(61,600)	(79,400)
2015	Supply Totals[4]	257,500	331,200	307,200	275,800	256,800
	Demand Totals[5]	370,500	390,700	407,800	424,700	434,100
	Difference	(113,000)	(59,500)	(100,600)	(148,900)	(177,300)

The analysis indicates that, with planned supplies, demands exceed supplies beginning in the second year of drought. Table 7-5 shows estimated short-term water use reductions that would be needed to maintain groundwater storage in the normal stage, based on the shortfalls identified in Table 7-4. The percentages in the third year assume no water use reductions were in place the previous years. The District plans to update its Water Master Plan in 2017. As part of the planning process, the District will evaluate supply projects and programs to minimize the need to call for water use reductions greater than 10 percent. This is consistent with District BAO Interpretation Strategy S 2.4, which states, "[d]evelop water supplies designed to meet at least 100 percent of average annual water demand identified in the District's Urban Water Management Plan during non-drought years and at least 90 percent of average annual water demand in drought years." Additional projects and programs may include additional long-term water conservation savings, water recycling, recharge capacity, storm water capture and reuse, banking, and storage. Water Master Plan implementation will be staged to minimize the risk of stranded investments or under investment should demands not increase as projected.

[3] Year 2025 has better reliability than 2020 because several projects, including potable reuse and dam retrofits, are scheduled to be completed between 2020 and 2025. After that, demands increase more quickly than supplies increase.
[4] Supply totals include the use of transfers and reserves.
[5] The demands in Table 7-4 are lower than average because less treated water is being distributed and, therefore, treated water losses are lower.

Table 7-5. Estimated Short-Term Water Use Reductions during Droughts

Year	2020	2025	2030	2035	2040
2013	0%	0%	0%	0%	0%
2014	15%	0%	10%	15%	20%
2015	30%	15%	25%	35%	40%

7.3 Regional Supply Reliability

The Water Master Plan's "Ensure Sustainability" strategy includes securing existing supplies and infrastructure, optimizing the use of existing supplies and infrastructure, and expanding water recycling and long-term water conservation savings. As part of this strategy, the Water Master Plan estimates that water conservation and recycling, combined, will increase from about 15 percent of the county's water supply mix to about 26 percent. Developing these local, drought-proof sources and managing demands reduces reliance on imported water supplies.

The District is working with seven water agencies in the Bay Area (Alameda County Water District, BAWSCA, Contra Costa Water District, East Bay Municipal Utility District, Marin Municipal Water District, SFPUC and Zone 7 Water Agency) to investigate opportunities for regional collaboration. The purpose of this planning effort, known as Bay Area Regional Reliability (BARR), is to identify projects and processes to enhance water supply reliability across the region, leverage existing infrastructure investments, facilitate water transfers during critical shortages, and improve climate change resiliency. Projects to be considered will include interagency interties and pipelines; treatment plant improvements and expansion; groundwater management and recharge; potable reuse; desalination; and water transfers. While no specific capacity or supply has been identified, this program may result in the addition of future supplies that would benefit Santa Clara County.

The District is an active participant in the Bay Area and Pajaro River Watershed Integrated Regional Water Management (IRWM) programs. The IRWM Plans were completed in 2006 and 2007 and updated in 2013 and 2014. They describe the regions' water supply and water quality, wastewater and water recycling, storm water and flood protection, and habitat protection and ecosystem restoration objectives and efforts. To date, the District has received nearly $70 million in IRWM grant funding awards to support various water resource management projects, including water recycling, water conservation, and dam seismic retrofits.

Chapter 8 – Water Shortage Contingency Planning

This chapter describes the development, actions and implementation of the District's water shortage contingency plan. In addition, information related to a three dry year scenario, revenue and expenditure impacts, mechanisms to determine reductions in water use and catastrophic interruption planning is provided. Where applicable, actions taken in the recent four year drought are summarized for reference.

8.1 Water Supply Strategy

Overall, the District manages water supplies and programs to maximize storage of wet period supplies for use during dry periods when other sources of supply are insufficient to meet demands. Because the groundwater subbasins are able to store the largest amount of local reserves, the District depends on maintaining adequate storage in the subbasins to get through extended dry periods. The District also has storage in Semitropic Groundwater Bank and has withdrawn more than 120,000 AF during the last three years.

In addition to working with retailers, cities, and the County to manage water use during shortages, the District augments supplies by investing in supplemental supply sources. Supplemental supplies include transfers, exchanges, and Semitropic Groundwater Bank takes. The decision on when and in which sequence supply will be utilized during different stages of shortage is managed by annual operations and planning and includes consideration of availability and cost.

8.2 Water Shortage Contingency Plan Objectives

The water shortage contingency plan stages and water use reduction targets were developed by the District consistent with the District's Board Policy, water supply objective 2.1.1 "…maintain and develop groundwater to optimize reliability…" and in consideration of the following water shortage management objectives:

- Minimize economic, social, and environmental hardships to the community caused by water shortages. As water becomes more scarce and the community is faced with increasing cutbacks, the costs of shortage rise and the risk of lasting damages to residences, businesses and the environment increases.
- Establish water use reduction targets, manage supplies and work closely with retailers and cities in developing efficient and effective demand reduction measures that concentrate on eliminating non-essential uses first.
- Maintain and safeguard essential water supplies for public health and safety needs. The water shortage contingency plan anticipates and accounts for water supply shortages due to acute catastrophic events. The District's water supply system is vulnerable to several disaster scenarios including a loss of imported supplies due to a Delta levee outage, an interruption of San Francisco's regional water system deliveries to Santa Clara County, and/or a major earthquake.

8.3 Water Shortage Contingency Plan Stages and Strategies

This section describes the District's contingency planning for actions that can be taken should water shortages occur, including a 50 percent reduction in water supplies. The plan provides a strategy for early water shortage detection, shortage stages, shortage response actions, and a public outreach and communication plan. A water shortage occurs when water supplies available to the District are insufficient to meet water demands. Water supply shortages can occur for a variety of reasons including droughts, loss in ability to capture, divert, store, or utilize local supplies, and/or facility outages.

The purpose of contingency planning is to be prepared ahead of time and to establish actions and procedures for managing water supplies and demands during water supply reductions and water shortages. An important component of meaningful shortage response is the ability to recognize a pending shortage before it occurs, early

enough, so that several options remain available and before supplies that may be crucial later have not been depleted.

Many factors and events can and do affect water supply availability in any given year. The District has determined that projected end-of-year groundwater storage serves as an early warning sign and is a good indicator of potential water shortages. Groundwater storage accounts for surface water supplies as these supplies either directly or indirectly contribute to projected groundwater storage.

The District is the groundwater management agency for Santa Clara County. However, groundwater is pumped by others including water retailers, private well owners, and agricultural users. The District can influence groundwater pumping through financial and management practices, but it does not currently directly control the amount of pumping[1]. Therefore, to execute effective responses to a water shortage, the District works closely with groundwater users, cities, county, and water retailers to plan and coordinate water shortage contingency actions.

8.3.1 Water Shortage Actions

This section describes the five-stage approach and overall strategy for dealing with water shortages. The District's Water Shortage Contingency Plan is in Table 8-1. When the District Board of Directors calls for short-term water use reductions, the cities and water retailers consider implementing the water shortage contingency plan actions identified in their UWMPs in order to achieve the necessary water use reductions. Actions to achieve the desired shortage response may be different for each city/water retailer depending on service area composition (commercial, industrial, residential) and source of water supplies. However, some actions are common to several of the cities/water retailers, providing for more consistent implementation and messaging.

Reducing water consumption during a water shortage is generally achieved through increased education leading to behavioral changes (e.g., shutting off the water while brushing one's teeth) and water use restrictions (e.g., yard irrigation only allowed two days a week). These water savings are considered short term water use reductions and are distinct from long term on-going conservation programs described in Chapter 9.

8.3.2 Consumption Reduction Methods

The response to the 2012 to 2015 drought illustrates how the District, municipalities, county, and retailers coordinate to reduce water use during water shortages. On February 25, 2014, the District Board of Directors approved a resolution setting a countywide water use reduction target equal to 20 percent of 2013 water use through December 31, 2014, and recommended that retail water agencies, local municipalities and the County of Santa Clara (County) implement mandatory measures as needed to achieve the 20 percent water use reduction target. On March 24, 2015, the board called for 30 percent water use reductions, and recommended that retail water agencies, municipalities and the County implement mandatory measures as needed to accomplish that target, including a two day a week outdoor irrigation schedule. The District's drought response actions to help assist the retailers, cities, and the County achieve the water use reduction targets included:

- Increased rebates for landscape conversions, irrigation hardware upgrades, graywater laundry to landscape systems, and many commercial fixtures;
- Creation of the Water Waste Reporting and Inspection Program;

[1] The Sustainable Groundwater Management Act (SGMA) provides various powers and authorities to Groundwater Sustainability Agencies (GSAs), including the ability to regulate pumping or impose reasonable operating requirements on wells. The District is in the process of formalizing its role as the GSA for the Santa Clara and Llagas Subbasins. In addition, it is updating its Groundwater Management Plan to meet SGMA requirements. The updated Groundwater Management Plan will document the process the District will use to work with stakeholders prior to implementing any additional groundwater management authorities.

Table 8-1. Water Shortage Contingency Plan

Stage	Stage Title	Projected End-of-Year Groundwater Storage	Requested Short-Term Water Use Reduction	Actions
Stage 1	Normal	Above 300,000 AF	None	The District continues ongoing outreach strategies aimed toward achieving long-term water conservation targets. Messages in this stage focus on services and rebate programs the District provides to facilitate water use efficiency for residents, agriculture, and business. While other stages are more urgent, successful outcomes in Stage 1 are vital to long-term water supply reliability.
Stage 2	Alert	250,000 – 300,000 AF	0 – 10%	This stage is meant to warn customers that current water use is tapping groundwater reserves. Coordinate ordinances with cities and prepare for a Stage 3 situation. Additional communication tools can be employed to augment Stage 1 efforts, promote immediate behavioral changes, and set the tone for the onset of shortages. Specific implementation plans will be developed when a worsening of the water shortage has occurred. Supplemental funding may be identified to augment budgeted efforts.
Stage 3	Severe	200,000 – 250,000 AF	10 – 20%	Shortage conditions are worsening, requiring close coordination with retailers and cities to enact ordinances and water use restrictions. Requires significant behavioral change by water users. The intensity of communication efforts will increase as the severity of shortage increases. Messages are modified to reflect for dire circumstances.
Stage 4	Critical	150,000 – 200,000 AF	20 – 40%	This is the most severe stage in a multiyear drought. The District will expand Stage 3 activities and encourage retailers and cities to enforce their water shortage contingency plans, which could include fines for repeated violations.
Stage 5	Emergency	Below 150,000 AF	40 to 50%	Stage 5 of the water shortage contingency plan is meant to address an immediate crisis such as a major infrastructure failure. Water supply would only be available to meet health and safety needs. The District would activate its EOC and provide daily updates on conditions.

- Increased staffing to support a water conservation call center;
- Development of several multimedia water conservation outreach campaigns, including "Brown is the New Green" and "Fight the Drought, Inside and Out";
- Dozens of panels, forums and presentations; and
- Direct mail letters encouraging participation in conservation programs.

A majority of the retailers adopted a coordinated two day/week watering schedule. Also, in addition to regular meetings with retailers and close contact with local agencies and elected officials, the District held two summits, one with the retailers and one with elected officials, in 2015 to facilitate increased water use reductions and increase coordination to meet the 30 percent reduction target. A common theme between the two summits was that messaging and policy development needs to be consistent and coordinated. The benefits of consistent and coordinated approaches include reduced confusion among residents, increased ease of implementation, and easier compliance and enforcement if needed.

Appendix I includes a copy of the District's Resolution calling for water use reductions in effect on May 10, 2016, as well as a copy of the District's April 2016 Monthly Drought Report that provides additional information on the District's drought response strategy and outcomes.

8.3.3 Mechanism to Determine Actual Reduction in Water Use

In times of shortage, staff will intensify its monitoring and evaluation of the following activities:

- Monthly and season-to-date rainfall at four rainfall stations within the county
- Reservoir storages
- Monthly recycled water deliveries
- Monthly and year-to-date water use for each major water retailer in the county
- Groundwater basin conditions
- Current retailer water use compared to a desired decrease in use

Note that not all water use data is available on a monthly basis. For example, many small well owners report their water usage on a 6 month cycle. In some cases there is a two-month time-lag from when the water is used and reported. A small percentage of all water use, primarily private well owners, is unmetered and is estimated based on standard tables. Finally, the District does not have access to individual water use account data that would enable it to determine the reductions by customer class or by customer unit (per household, for example). This data is only available at the retailer level.

8.3.4 Revenue and Expenditure Impacts

Under a water shortage scenario, District expenses are anticipated to increase as a result of actions to augment water supply and reduce use. At the same time, revenue would decrease as a result of reduction in water sales. The District maintains supplemental funds in its financial reserves to help pay for increased expenditures to remedy shortages. These funds need to be replenished in subsequent years however, through groundwater production charges and treated water charges. The FY 2016 budget for the supplemental waters supply reserve is $12.7M and is projected to grow to roughly $17.9 M by FY 2026. The minimum for this reserve is 20 percent of the annual water purchase budget. The District Board may adjust its adopted groundwater production charges mid-way through the fiscal year. This allows the opportunity to react to unanticipated changes in expenditures or revenue in a timely fashion.

For instance, the District began to incur extraordinary costs as a result of actions taken in response to the 2012 to 2015 drought. As of May 2016, $44.5M had been budgeted or spent on drought response activities. Water charges have been increased to cover these costs.

8.4 Three Dry Years Scenario

This section presents an estimate of the water supply available during each of the next three years, assuming a repeat of the driest three-year historical hydrologic sequence. Minimum total available supplies (including both local and imported supplies) for a consecutive three year sequence occurred in the years 2013 through 2015 in Santa Clara County. Table 8-2 summarizes the water supply that could be expected in a repeat of those three years. The projected supplies are based on estimated natural groundwater recharge, actual local surface water supplies, actual 2015 recycled water use, actual SFPUC water use, actual SWP and CVP imported water allocations, and actual Semitropic takes, transfers, and carryover use. The supplies in all three years exceed 2015 water use and supplies in 2013 exceed 2013 water use. Depending on projected end-of-year groundwater storage, the District would work with retailers and municipalities to implement water use reductions necessary to protect groundwater storage and minimize the risk of land subsidence.

Table 8-2. Minimum Supply Next Three Years (AF)

	2017	2018	2019
Total Supply, including Supplemental Supplies and Carryover	418,400	341,000	307,200

8.5 Catastrophic Interruption Planning

This section describes actions the District has taken to prepare for and the actions the District plans to implement during a catastrophic interruption of water supplies.

8.5.1 Emergency Operations Center

The District's Security and Emergency Services Unit (SESU) coordinates emergency response and recovery for the District. During any emergency, the District continues the primary missions of providing clean, safe water and flood protection to the people of Santa Clara County. SESU ensures that critical services are maintained and emergency response is centralized. SESU maintains a full-time professional emergency management staff trained and equipped to respond quickly at any time of day or night to support the District's Emergency Operations Center (EOC) and field responders.

The EOC is connected to other agencies and jurisdictions by an array of telecommunications, two-way radio, satellite telephone, and wireless messaging systems. In addition, two response vehicles with many of the same communications capabilities of the EOC enable staff to establish mobile emergency command posts just about anywhere field operations may require. OES maintains communications with local, state and national emergency management organizations and allied disaster preparedness and response agencies.

8.5.2 Milpitas Intertie

The SFPUC and District constructed a 40-mgd intertie between their two systems to exchange water during emergencies and planned maintenance.

8.5.3 Infrastructure Reliability Project

The District completed its first Water Utility Infrastructure Reliability Plan in 2005. The project measured the baseline performance of critical District facilities in emergency events and identified system vulnerabilities. The plan concluded that the District's water supply system could suffer up to a 60-day outage if a major event, such as a 7.9 magnitude earthquake on the San Andreas Fault, were to occur. Less severe hazards, such as other earthquakes, flooding and regional power outages had less of an impact on the District, with outage times ranging from one to 45 days. The project recommended several improvements to reduce the expected outage times, which the District has been implementing. In 2007, the District created a stockpile of emergency pipeline repair materials including large diameter spare pipe, internal pipeline joint seals, valves, and appurtenances. The stockpile marks a significant increase in reliability of the District's water supply system, as it helps to reduce outage time following a large earthquake from approximately 60 to 30 days. The District has also implemented several emergency planning recommendations to meet the goal of reducing outage time to 30 days. These include developing a list of contractors available on standing order to use during an emergency event and participating in CalWARN, a mutual aid network for water and wastewater utilities. Additional planned projects include installing four line valves on the District's treated water pipelines to allow the District to isolate damaged portions of pipelines.

The 2005 plan also recommended constructing approximately 40 distributed groundwater wells that would be tied into the treated water system to provide backup emergency supply if the District's treatment plants and raw water sources went down. Since that study was completed in 2005, the District found that the 40 groundwater wells are not fully needed because treated water retailers have learned to operate their systems without District treated water supplies for several weeks during District pipeline shutdowns for maintenance. In addition, the District is making other substantial investments in reliability, including seismic retrofits at Anderson and Calero Dams and reliability upgrades at the Rinconada Water Treatment Plant, and retailers have made substantial improvements to their systems.

Because of these changed conditions, the District is currently updating its Infrastructure Reliability Plan. The goal of the update is to identify new reliability improvements that are more regional, less capital intensive alternatives to the well fields. So far, the project has analyzed several outage scenarios including earthquake, super-storm, and Delta outage (discussed in the following section), and has identified the expected outage duration of the District's system for each event. Analyses show that expected outage time for the District's system in a major event is approximately 30 days. The project team has also worked with the District's retail customers to identify a reasonable level of service goal for hazard events. In most cases, retailers can continue to provide average winter demands without District treated water for the full outage duration of 30 days or more. There are some exceptions, and specific geographical areas that will benefit from some modest reliability improvements, and the plan will focus on making recommendations for these specific areas. Projects likely to be recommended include new or upgraded retailer interties, more isolation valves on the District's pipelines, new retailer wells, and operational agreements for use of District or retailer systems to convey water to other retailers. The updated plan and final recommendations will be complete in June 2016.

8.5.4 Delta-Conveyed Supply Interruption

The California Department of Water Resources (DWR) has estimated that in the event of a major earthquake in or near the Delta, regular water supply deliveries from the SWP could be interrupted for up to three years, posing a substantial risk to the California business economy. Accordingly, a post-event strategy has been developed which would provide necessary water supply protections. The plan has been coordinated through DWR, the Army Corps of Engineers (Corps), Bureau of Reclamation, California Office of Emergency Services (Cal OES), the Metropolitan Water

District of Southern California, and the State Water Contractors. Full implementation of the plan would enable resumption of at least partial deliveries from the Delta in less than six months.

DWR's Delta Flood Emergency Management Plan includes strategies for responding to Delta levee failures, including establishing an emergency freshwater pathway from the central Delta to the export pumps in the south Delta. The plan includes the pre-positioning of emergency construction materials at existing and new stockpiles and warehouse sites in the Delta, and development of tactical modeling tools (DWR Emergency Response Tool) to predict levee repair logistics, water quality conditions, and timelines of levee repair and suitable water quality to restore exports. The plan has been extensively coordinated with state, federal and local emergency response agencies. DWR, in conjunction with local agencies, the Corps and Cal OES, regularly conduct simulated and field exercises to test and revise the plan under real time conditions.

The DWR Delta Levees Subvention Program has prioritized, funded, and implemented levee improvements along the emergency freshwater pathway and other water supply corridors in the central and south Delta region. These efforts have been complementary to the DWR Delta Flood Emergency Management Plan, which along with use of pre-positioned emergency flood fight materials in the Delta, relies on pathway and other levees providing reasonable seismic performance to facilitate restoration of the freshwater pathway after a severe earthquake. Together, these two DWR programs have been successful in implementing a coordinated strategy of emergency preparedness for the benefit of SWP and CVP export systems.

The District analyzed the impacts of a Delta outage to determine if the District could continue limited service for the outage duration with no imported water supplies. The analysis assumed that all local District infrastructure will remain intact. An earthquake or flood in the Delta is unlikely to also badly damage local infrastructure. The analysis also assumed normal hydrologic conditions and starting storage conditions, rather than stacking disaster upon disaster (i.e., earthquake plus drought, etc.), access to SFPUC supplies, and implementation of water use reductions of 20 percent.

The analysis indicates that the impacts of a six-month Delta outage are largely operational as they would require retailers to supplement their treated water supplies with groundwater and for the District to actively manage the groundwater recharge program to meet countywide needs. Even with increased pumping, groundwater storage is estimated to remain in the normal/Stage 1 range. Thus, the impacts of a six-month Delta outage are manageable assuming the District continues with planned investments described in the 2012 Water Supply and Infrastructure Master Plan.

The District would call for more aggressive water use reductions (up to 50 percent) if a Delta outage were to occur during a drought.

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Chapter 9 – Demand Management Measures

The District has been and continues to be a leader in water conservation with innovative, effective, and comprehensive-in-scope programs. This is consistent with Board Ends Policy E-2.1.5, which states the following: "maximize water use efficiency, water conservation and demand management opportunities."

As one of the initial signatories to the California Urban Water Conservation Council's (CUWCC) 1991 Memorandum of Understanding Regarding Urban Water Conservation Best Management Practices (MOU), the District is firmly committed to the implementation of the Best Management Practices (BMPs) or Demand Management Measures (DMMs).

A diversified water supply portfolio is an important element in meeting long-term water reliability, and the District recognizes the need for local programs, such as water conservation, to diversify future investments. Using 1992 as a baseline, the District saved approximately 64,000 AFY in 2015, which keeps us on track to meet our long-term goal of 98,800 AFY by 2030 from both passive and active water conservation. Table 9-1 illustrates the projected savings in five year increments.

Table 9-1. Projected Water Conservation Savings

	2020	2025	2030	2035	2040
Water Conservation Savings Target (AF)	80,900	91,100	98,800	98,800	98,800

The long-term water conservation savings discussed above are in addition to any short-term water use reductions that may be implemented during water shortages as described in Chapter 8.

9.1 Demand Management Measures for Wholesale Agencies

This section describes the District's implementation of required DMMs for wholesale agencies – metering, public education and outreach, water conservation program coordination and staffing, other demand management measures, and asset management. The other measures that the District implements to reduce demands and assist retailers are described in Section 9.2.

9.1.1 Metering

On a monthly basis, the District meters and bills by volume of use all of its retail agency potable water supply deliveries. All municipal and industrial water users in the county are currently metered and were metered prior to the adoption of the MOU. The District operates an aggressive water measurement program for both treated water deliveries and groundwater users. The current water measurement system measures 100 percent of all treated water deliveries, 95 percent of surface-delivered raw water deliveries, and 95 percent of all groundwater pumping. The remaining 5 percent (by volume) of groundwater pumping is done by small water users such as residential well owners. Although these residential wells are not metered, an estimate of water pumping or usage is made to determine groundwater production charges. Meters have not been installed on these wells because the cost of installing and reading the meters exceeds the revenue generated by these wells.

In addition, the District offers rebates for the installation of submeters (since 2008) as well as switching from a mixed-use meter to a dedicated landscape meter (since 2012). The submeter rebate program provides $150 per submeter installed at multi-family housing complexes, such as mobile home parks and condominium complexes. In 2015, the program was expanded to include individual well owners and homes on a shared well. The District plans to continue these programs to meet the region's long-term water conservation goals. Additional program details are in Section 9.2.2.4.

9.1.2 Public Outreach and School Education Programs

9.1.2.1 Public Outreach Programs

Outreach activities include multi-media marketing campaigns directed at the diverse county population, website development and maintenance, social media, publications, public meetings, District participation at community events, interagency partnerships, corporate environmental fairs, professional trade shows, water conservation workshops and seminars, and a speaker's bureau. Specifically in 2014 and 2015, outreach efforts focused on three strategies:

1. Support customers and key stakeholders to minimize adverse impacts resulting from the drought conditions;
2. Advance community knowledge, awareness, and understanding of the water supply system and services provided by the District; and
3. Support the Board of Directors.

These strategies were implemented by delivering broad-based advertising programs, participating in community events, collaborating with water retailers to develop their own outreach materials, and to reach non-English speaking residents to ensure they are informed about water issues. In fact, multi-ethnic outreach expanded beyond translating existing outreach materials to targeting media stories, coverage, and paid advertisements specifically to their communities.

Every year the District carries out a multi-media, multi-ethnic campaign emphasizing the importance of water conservation. Until 2008, the campaign was carried out primarily during late spring and the summer months. In 2009, based on a recommendation from the newly developed Five-Year Water Conservation Marketing Plan, the District launched a new year-long campaign. The campaign, "Save 20 gallons", was developed in partnership with the local cities, water retailers, and the county. The idea was to focus on people's daily activities and to quantify the volume of water that can be saved by making minor modifications to everyday behavior.

The District's public outreach efforts also include social media, updates to our website (www.valleywater.org), and development of a microsite that served to transition messaging from a specific target (www.save20gallons.org) to a more general, ongoing objective in 2015 (www.watersavings.org). The websites are updated throughout the year to include the latest program information, the most recent ads, new reports/studies, updates on our workshops, and the addition of special features such as a tour of a virtual water-efficient-efficient home. In addition, the District produced and distributed collateral material, including program flyers, bookmarks, free shower timers and other conservation devices, posters, yard and garden signs, restaurant signs for only serving water upon request, hotel signs encouraging the occupant to reuse their towels, static-cling stickers for restroom mirrors, and shower timers.

In late 2012, the District added a new monthly public access television series, "People behind Your Water". These half-hour broadcasts air on a local cable access channel, as well as the District's YouTube channel. The purpose of this show is to highlight various water issues, and managers and personnel who manage the District's water resources. In 2012, the District was honored to receive the 2012 Silicon Valley Water Conservation Award for its leadership in water conservation as a large government agency and its ongoing support for sustainable, innovative, cost effective, comprehensive programs, and emerging technologies on behalf of its retailers.

In 2013, the District continued to expand its role and services utilizing social media. Access Valley Water was enhanced to facilitate community reporting of water waste complaints. The District also utilized Twitter, Facebook, and YouTube in addition to more traditional efforts such as bill inserts, direct mailers, and direct community outreach to educate the public. Targeted, paid advertisements were purchased from Facebook in 2014 and 2015.

Chapter 9 – Demand Management Measures

As the drought intensified in 2014 and 2015, the District's Board made public their support for conservation messaging by approving an additional $2.4 million to support it. Campaign messaging included "It's Time. Save Water."; "*El Agua es Asunto de Todos* (Water is everybody's business)"; "Help Out,We're in a Drought: Save Water Inside and Out"; "Brown is the New Green"; "Rain or Shine"; and "One Year of Rain Won't End Four Years of Drought". Additionally, the EPA Water Sense's "Fix a Leak Week" is promoted annually every March; 2015 saw this promotion expand to Twitter and Facebook. Furthermore in 2015, the District collaborated with a local nonprofit to target neighborhoods that had well-maintained lawns with door hangers that provided rebate program information. The campaigns were carried out in collaboration with local retailers, cities, and the county.

In addition to the media campaigns mentioned above, the District also implements various program-specific marketing throughout the year. In fact, these efforts helped produce a dramatic increase in participation in water conservation programs in 2014 and 2015. Notably, these efforts to promote programs and resources available to the public resulted in a fivefold increase in requests for program participation in the Landscape Rebate Program (Sections 9.2.4.3 and 9.2.4.4). As a result, local businesses and residents installed climate appropriate landscapes, while others let their lawns go brown (the District provided the option to accompany these actions with yard signs stating either "We're WaterSmart" or "Brown is the New Green", respectively). Once funding began to be depleted for the landscape programs in early late 2014, outreach efforts shifted to promoting residential water-use surveys through the Water-Wise House Call Program (Section 9.2.2.1).

Other efforts included sending postcards and/or letters with a promotional flyer to end-users; bill inserts (twice per year or more); handing out program flyers and brochures at various events; purchasing billboard, television, radio, and social media advertisements; and using point-of-purchase advertisements for water-efficient technologies. For example, program-specific details such as qualifying fixtures and eligibility periods are communicated between the District and local plumbing suppliers, "big box" stores, and smaller retailers through a private contractor. This effort began in July 2011 when the District developed two new marketing pieces: a newly designed brochure and a point-of-purchase sticker to identify toilet models in the marketplace that qualified for the District's rebate. These efforts have been improved and adjusted through June 2015 in response to changing rebate criteria and customer feedback.

Water Saving Heroes Program & Business Outreach

In 2014 and through 2015, the District launched the Water Saving Heroes Program to recognize businesses, institutions, and residents for their successful water saving practices during the drought. Water Saving Heroes included homeowners who had transformed their yards into water-friendly landscapes, and commercial and institutional properties that had implemented effective water conservation strategies and environmentally-sustainable practices.

In 2015, the District produced nine Water Saving Hero e-newsletters which were emailed to 21,200 subscribers. Thirty-five heroes were recognized in the newsletters. Of these, 18 Water Saving Heroes received Certificates of Appreciation and were recognized at several Board meetings throughout the year. In June, a special sports edition of Water Heroes e-newsletter featured the San Francisco 49ers, San José Sharks, and the San José Earthquakes. Also in 2015, the District partnered with the *Silicon Valley Business Journal* to specifically recognize and thank five local businesses for their water saving accomplishments.

Nursery Program

To increase the public's awareness of water-efficient gardening techniques, in 1995 the District developed the Nursery Program. This program distributes, at least quarterly, a series of educational materials to nurseries throughout the county. To display the materials, the program includes literature racks offering free informational materials about water-wise gardening, efficient irrigation techniques, drought-resistant plants, drip irrigation, and District water conservation programs. In future program years, the literature racks may ultimately be replaced or

supplemented with digital resources that would not need to be replenished as regularly. The Nursery Program literature is currently being distributed to and displayed at more than 30 participating nurseries.

Workshops

Each spring between 2010 and 2012, the District hosted its Water-Efficient Landscape Workshop Series for county residents. The series consisted of four consecutive class sessions addressing topics such as garden design, plant selection, irrigation design, installation and maintenance techniques and gardening with native species. The series drew approximately 150 to 200 attendees each year. The District also offered irrigation workshops that provided hands-on training to English- and Spanish-speaking landscape professionals on irrigation controller programming, system scheduling, and irrigation trouble-shooting. In each class of approximately 40, the participating landscape professionals collectively maintained around 400 sites in the county.

After 20 years, these workshop series were discontinued by the District in order to redirect personnel and media resources to drought-related outreach and efforts during the 2013-2015 calendar years. In addition to the drought, the District personnel observed many of the same individuals attended these workshops year after year. The District continues to advertise and promote similar workshops implemented by neighboring agencies through our Events webpage. To reach a new audience and to promote participation in the District's Landscape Rebate Program (Sections 9.2.4.3 and 9.2.4.4), the District opted to focus on workshops at various nurseries throughout the County. In spring 2015, a series of talks at local nurseries were provided that attracted up to 140 individuals. This new approach was more relevant to the community during the drought since its focus was on both the District's Landscape Rebate Program and how to convert lawns to low water-use landscapes independent of the rebate.

Going Native Garden Tour

To showcase exemplary native plant gardens, the District has co-sponsored the Going Native Garden Tour every spring since 2003. Between 2010 and 2015, up to 13,000 participants had visited upwards of 70 gardens annually. These native plant gardens demonstrated the beauty and efficiency of well-maintained native gardens to residents of Santa Clara and San Mateo counties. In addition to showcasing native plants, at least one garden offered native plants for sale each year. Currently, 19 demonstration gardens are promoted on the District's webpage year-round. A free app for the Apple iPhone and an independent website are maintained to promote and support this program.

Bill Inserts

In the fall of 1999, the District developed a bill insert promoting the reduction of landscape water use by reminding homeowners to cut back on their watering schedule during the fall and winter months. In collaboration with several of the District's water retailers, this insert has been updated and mailed each year in October/November. In addition to the fall back bill insert, the District has developed spring and summer bill inserts and worked with the Santa Clara County cities and retailers to distribute them.

Community Events

Each year the District participates in numerous community events, including environmental fairs, Earth Day events, garden tours, and many others. Since June 2010, District staff has distributed multiple educational materials and program flyers at nearly 430 events. In fact, more than 260 community events had been held in the last two years (since June 2014). These events include:

- Spring Garden Fairs
- Santa Clara County Home and Garden Show
- City of Cupertino Earth Day Fair
- Green Plumbers Workshop
- Silicon Valley Water Conservation Awards
- Going Native Garden Tour

9.1.2.2 School Education Program

Since 1995 the District has employed a full-time staff to coordinate the school education program. This included developing and implementing school programs, contracting with the Youth Science Institute for additional instructors, and supervising university student interns as classroom assistants.

The District has been continually active in this area by providing free classroom presentations, puppet plays, and tours of District facilities to schools within the county. The objective is to teach students about water conservation, water supply, watershed stewardship, and flood protection. The District also provides school curricula to local educators, including workbooks and videos, as well as hands-on training for teachers.

Over the last five years, the District's program has reached over 11,000 students per year, with a high of 22,651 students in 2013. In 2015, over 10,770 kindergarten through 6th grade students and nearly 500 7th grade through 12th grade students were reached. Of the 478 classroom presentations provided in 2015, over 75% were to teachers who had been participating for fewer than 5 years indicating that the District's education programs are continuing to meet an expanding audience. In addition, the District staffed an education booth at 27 events and provided 8 tours to teach the community about water conservation and other District services in 2015.

Materials distributed to students included topical lessons, which vary by age and meet all state education framework requirements and are grade-level appropriate. Examples include lessons using puppet shows and storytelling for pre-kindergarten and early elementary students, and using hands-on science activities and career development information for high school and college students. Finally, included in these educational services is Project WET (Water Education for Teachers) to train teachers how to lead their own classroom activities and lectures in order to independently educate their students on water-related topics into the future. All students who participated in the program received materials.

9.1.3 Conservation Coordinator

The District established the position of Water Conservation Coordinator in 1990. The current Water Conservation Coordinator is:

Name: Jerry De La Piedra
Title: Unit Manager – Water Supply Planning and Conservation Unit
Address: 5750 Almaden Expressway, San José, CA 95118
Phone: (408) 630-2257 Fax: (408) 979-5639
E-mail: gdelapiedra@valleywater.org

There are four full-time staff members in the Water Conservation Program and up to 20 student interns (number varies depending on season and program needs). Staff includes one senior water conservation specialist and three water conservation specialists. As part of the recent drought response, a program administrator, an office specialist, and a management analyst were temporarily added to the program. The proposed FY 17 water conservation budget is $5.7 million, with funding from water charges, cost-share agreements, and grants.

9.1.4 Other Demand Management Measures

In 2012 voters in Santa Clara County approved the Safe, Clean Water and Natural Flood Protection Program. This enables the District to provide up to $1,000,000 in grant funding for a Water Conservation Innovative Research Grant Program (Grant Program). The goal of the Grant Program is to identify new, innovative technologies that could potentially be incorporated into the District's long-term conservation programs. To date, the District has awarded 11 grants for a total of $458,500 through this program.

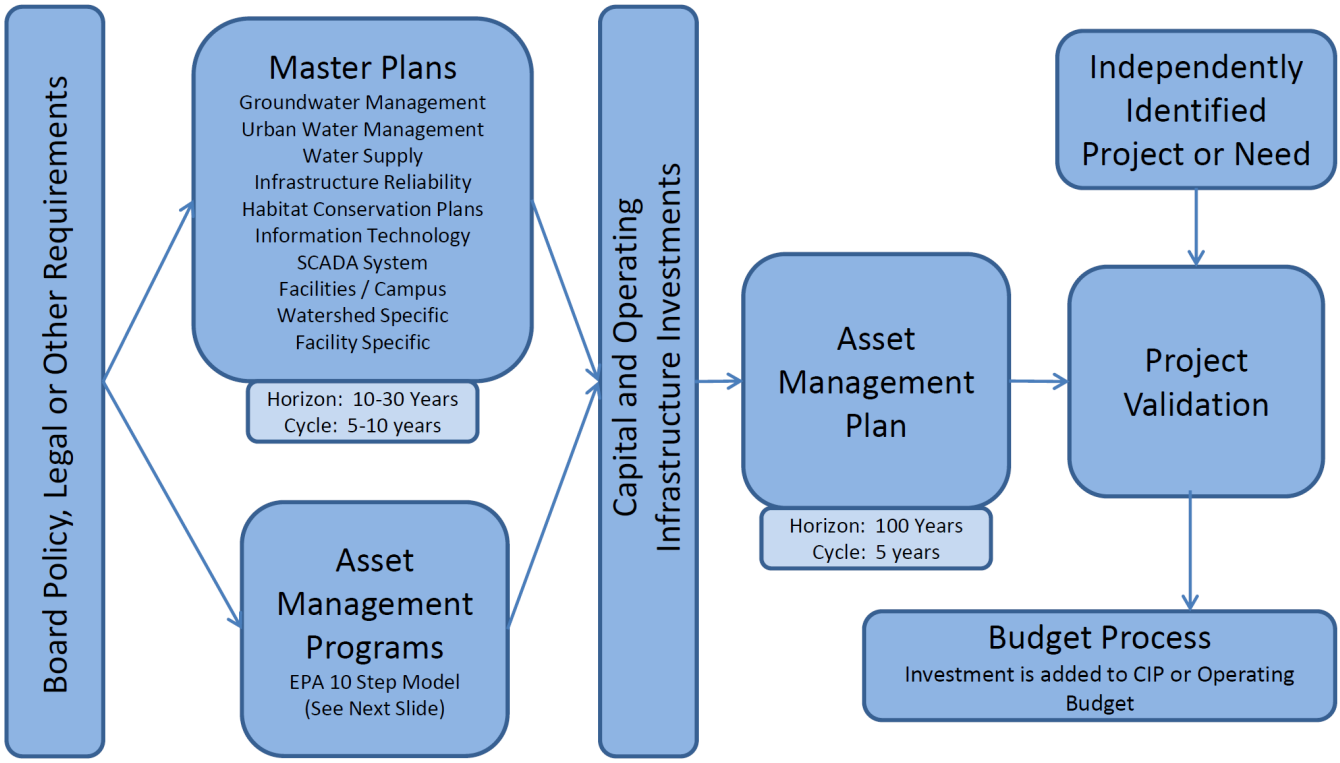
Retailers were also supported through the grant program. Specifically, Advanced Metering Infrastructure (AMI) pilot programs were initiated by San José Water Company, Mountain View, Purissima Hills, and Palo Alto. The pilot

programs are evaluating how and whether to widely adopt this integrated system of smart meters, communications networks, and data management systems. One of the goals of such a system is to record customer consumption at least hourly by transmitting these data through a network that enables two-way communication between utilities and customers.

9.1.5 Asset Management

The District initiated its Asset Management Program in 2002 to ensure continued, reliable services at the level its customers require, at the lowest possible cost. The program includes maintaining an asset register and a formal, ongoing condition assessment program that monitors risks and maintains a long-term funding model to identify when future asset investments are expected. The District uses this information to develop annual maintenance work plans and make renewal and replacement decisions for the District's $7.05 billion in water utility assets. In the short term, the District's Asset Management Program seeks to reduce unplanned asset failures or service outages, and the economic, social, or environmental consequences of these failures. For the long-term, the program seeks to minimize operating and capital costs of owning these assets, and improve financial planning. The District's Asset Management Framework is illustrated in Figure 9-1. The District's Asset Management Plan is in Appendix J.

Figure 9-1. Asset Management Framework



9.2 Programmatic DMMs

The District and its major water retailers enjoy a special cooperative partnership in the regional implementation of a variety of water conservation programs. As the water wholesaler for Santa Clara County, the District is responsible for the implementation of the foundational DMM's. However, it is also implementing multiple components of many of the other DMMs.

Participation in all programs listed below is tracked by water retailer on a monthly basis. Furthermore, many water retailers participate in cost sharing agreements maintained by the District. These cost sharing agreements benefit all parties through economies of scale. In the 2014 and 2015 budget years, the District administered more than $2.7 million in cost-sharing agreements with the local cities, water retailers, and nonprofit organizations.

Additionally, the District has sent out (and will continue to send in the future) customer surveys to determine overall satisfaction with a program and to see how a program may be improved. The District will continue to work with its water retailers to implement the programs that best meet the public's needs while achieving the local, regional, and state-wide goals.

9.2.1 Water Waste Prevention Ordinances

The District collaborates with local agencies to develop model water use restrictions that will assist the water retailers and cities in the development of their water waste ordinances. For instance, in 2009 the District collaborated with local cities and water retailers to develop a model Drought Response and Water Waste Ordinance and then in 2010 to develop a model Drought Contingency Plan. More recently, the District collaborated with the water retailers to adopt a consistent two-day per week watering restriction throughout the majority of the county.

In 2014, as part of the District's response to the ongoing drought, the District initiated a Water Waste Inspector Program (Program) that will continue through the spring of 2016. The idea behind the Program is to facilitate and respond to reports of water waste and violations of local water use restrictions. It also provides an opportunity to educate the homeowner or business on water conservation as well as the various rebate and technical assistance programs the District offers. To facilitate the community's ability to report water waste, four reporting options were developed: email, a water-waste hotline, a portal on the District's website, and through a mobile application developed for iPhone and Android users.

9.2.2 Residential Programs

9.2.2.1 Residential Surveys

As the administrator of this program, the District develops and implements a strategy to target and market water-use surveys to single-family and multi-family residential customers throughout Santa Clara County, except for San José Water Company's service area as they administer their own program. Since 1998, the District has performed more than 40,500 residential audits through the Water-Wise House Call Program, including more than 4,330 in 2015 (Table 9-2).

Table 9-2. Residential Program Participation between 2010 and 2015

Residential Programs	Last 6 Years	To-Date
Residential Surveys	12,910	40,509
Fixture Distribution	66,036	340,323
High-Efficiency Clothes Washers	75,812	168,278
High-Efficiency Toilets (HETs)	20,659	25,224
HET Direct Installation[1]	8,017	13,655
Submeters[2]	3,351	6,288
Graywater[3]	13	13
Total Participation	**187,344**	**596,026**

[1] Multi-family dwellings
[2] Includes commercial submeters: 2 installed in 2010 and 5 overall to-date
[3] 2015 was the first year of the program

The District's program includes educating the customer on how to read a water meter; checking flow rates of showerheads, faucet aerators, and toilets; installing low-flow showerheads, faucet aerators and/or toilet flappers if necessary; checking for leaks; checking the irrigation system for efficiency (including leaks); measuring landscaped area; developing an efficient irrigation schedule for the different seasons; and providing the customer with evaluation results, water savings recommendations, and other educational materials. In 2004, the District began programming a homeowner's controllers as well (i.e. if allowed by the homeowner, the surveyors will input the recommended schedules into the controller). Recently, the District increased program efficiency and participation by using landscape measurements from this program as an initial qualifying step for the Landscape Rebate Program (Sections 9.2.4.3 and 9.2.4.4), for those who chose to participate in both programs.

The District's largest retailer, the San José Water Company (SJWC), offers free water audits to all of its customers. The audits are performed at customer request, typically in response to a high water bill concern and/or in response to SJWC or District marketing efforts. Audits are performed for both residential and commercial customers. The District supports SJWC's water audit program by providing free water conservation supplies, such as showerheads and faucet aerators. SJWC began performing water audits at the end of 1991 and is estimated to have completed over 38,000 audits since the program began. The District also distributes high-quality, low-flow showerheads and faucet aerators to single-family and multi-family residents through the water retailers and public events. Since program inception in 1992, more than 340,000 low-flow showerheads and aerators have been distributed throughout the county, including more than 66,000 in the last 6 years (Table 9-2).

The District plans to continue offering free showerheads and aerators through its Water-Wise House Call Program, its water retailers, and through various outreach events to meet the region's long-term water conservation goals.

9.2.2.2 High-Efficiency Clothes Washers

The District has offered a residential high-efficiency washer rebate since July of 1995. In October 2001 the District began participating in the regional Bay Area Water Utility Clothes Washer Rebate Program, which has been successfully partnering with PG&E since January 2008. To address concerns for local water quality, washers that utilized silver-ion technology do not qualify for this program regardless of their efficiency. In 2010, the District and PG&E offered a combined rebate of $175 ($50 from PG&E; $125 from the District) for clothes washers in the Consortium for Energy Efficiency's (CEE's) Tier 3, the most water-efficient category. In subsequent years the rebate

amount was adjusted along with other program criteria. For the last half of 2015, a multi-tiered combined rebate was implemented to transition program participants to more stringent fixture standards:

- Purchasing Energy Star Most Efficient (ESME) washers resulted in the combined rebate increasing to $200 ($125 of which was from the District).
- Purchasing the CEE's Tier 3 washers received a reduced District contribution of only $50 with the goal of promoting washers that qualify for the more efficient standard.

In January 2015, qualifying standards were adjusted to streamline requirements to only rebate for qualifying ESME washers at a combined rebate of $150 ($100 of which was from the District). The recently implemented maximum $150 rebate is planned to continue through 2016 for qualifying ESME washers only.

The District has given out more than 168,000 rebates since the program began in 1995 (over 9,000 approved rebates in last 12 months of July 2014 to June 2015) and will continue to offer this program through 2016 in order to reach the region's long-term water conservation goals.

9.2.2.3 High-Efficiency Toilets

From 1992 through June 2003, the District had provided incentives for the retrofit of approximately 244,000 residential toilets. This incentive was implemented in conjunction with each of the 13 participating retailers and through a series of cost-sharing agreements with the City of San José and the City of Sunnyvale.

In 2004, the District shifted to a high-efficiency toilet (HET) program. This $125 rebate program, which only incentivized purchasing Water Sense HETs, consisted of a rebate program for single-family and multi-family accounts. These more stringent standards promoted savings of approximately 20 percent per toilet relative to the federally regulated 1.6 gallon per flush (gpf) toilet standard. Between 2004 (the first year of the program) and 2013, the District rebated approximately 16,000 HETs, with relatively consistent participation from 2010 to 2013, the last full fiscal year that this program had a 1.28 gpf standard, over 11,000 rebates were issued (Table 9-2).

In response to the State of California's new requirement that all toilets sold or installed in the state flush at 1.28 gpf or less, January 2014 marked the beginning of the District's strictest standard yet for HETs to qualify for the rebate program - only Premium HETs would qualify for the $125 rebate. Premium HETs save nearly 15 percent more water than the state standard of 1.28 gpf by using only 1.1 gpf with superior flush performance (at least 600 grams per flush as evaluated by an independent group under standardized conditions).

Beginning in summer 2014 and prior to implementation of the new State standard, a tiered rebate was implemented wherein non-Premium HETs continued to be eligible for $50 rebates while Premium HETs could receive the $125 rebate. Once the State standard went into effect in January 2014, only Premium HETs qualified for the remainder of the program's lifespan.

Surprisingly, participation actually increased from levels observed between 2010 and 2013. In both 2014 and 2015 respectively, approximately 4,600 residential properties participated in the HET rebate program. In total, the District has issued over 25,200 HET rebates since this iteration of the District's high-efficiency toilet rebate began in 2004 (Table 9-2). The program will be phased out in 2016 in order to reprioritize funds to other programs with greater opportunities for water savings.

Part of a larger program targeted to commercial, industrial, and institutional sites (Section 9.2.3.2), the District offers a toilet replacement (direct installation) program for apartment complexes free of cost to the consumer. Since 2007, between 937 and 2,676 toilets were replaced by the District in qualifying apartment complexes. To qualify, the toilets within these apartment complexes must flush at 3.5 gpf or greater. In 2015, more than 1,500 inefficient toilets were replaced to bring the historical participation total to nearly 13,700 toilets replaced with HETs through this program (Table 9-2).

9.2.2.4 Submeter Rebate Program

Beginning as a pilot in 2001 and extended in 2008, this program provided a rebate of $100 (recently increased to $150) for every submeter installed at multi-family housing complexes, such as mobile home parks and condominium complexes. Water use records from participating mobile home parks in the pilot study showed an average water savings of 23 percent per mobile home. Declining from a peak of 1,740 in 2010, only 87 were installed in 2013. Despite increasing the rebate amount, only 223 were installed in 2015. During the course of this active program, nearly 6,300 rebates have been issued (Table 9-2). The District recently expanded the program to include individual well owners and homes on a shared well, and plans to continue to offer this program in the future in order to reach the region's long term water conservation goals.

9.2.2.5 Graywater Laundry to Landscape Rebate Program

In 2014, the District began offering a Graywater Laundry to Landscape (L2L) Rebate Program, generating much interest from the public. The rebate amount started at $100, and in response to the drought, increased to $200. In addition to providing a rebate for properly connecting a clothes washer to a laundry-to-landscape system, the graywater program also provides information, resources, and workshops on graywater as well as pre and post inspections for customers with site-specific characteristics. Resources include increasing awareness of local nonprofit organizations that specialize in graywater, and educating constituents on important factors to consider with more complicated graywater systems(e.g., branched-drain graywater and manufactured graywater systems) even though rebates for those options are not currently offered.

Graywater use in irrigated landscapes decrease potable water use by approximately 17 gallons per person per day or 14,565 gallons per household (on average), depending on the site and system design. California Plumbing Code (CPC) does not require a permit for installing an L2L system. However, the CPC is specific as to how L2L systems can be installed, and the District's rebate's eligibility requirements are framed in order to meet those specifications. Additionally, to protect public health and safety, prior to giving project approval, the District checks each applicant's property's depth to groundwater. At post inspections, applicants must demonstrate adherence to the CPC's specifications to help ensure graywater does not pool or drain to their neighbors' properties.

In 2015, 13 graywater rebates were issued from nearly 100 inquiries (Table 9-2). Participation doubled to 26 rebates in the last six months of 2015. In future program years, the District will continue to evaluate how to adjust or refocus this program in order to maximize the number of inquiries that result in issued rebates.

9.2.3 Commercial Programs

9.2.3.1 Custom/Measured Rebate Program

The Custom or Measured Rebate Program (formerly known as the Water Efficient Technologies or WET Program) provides rebates for process, technology, and equipment retrofits that save water. To encourage all commercial and industrial businesses to implement permanent water reduction measures, unique projects that meet program requirements are eligible for a rebate of $4 per hundred cubic feet (CCF) of water saved after the first 100 CCF saved. Examples of such projects are generally unique to specific industries such as ozone laundry systems or technologies to reduce potable water use when maintaining ice rinks, with myriad other examples. In January 2014, these rebates were temporarily increased to $8 per CCF to promote participation during the drought.

To date, the District has funded (either entirely or through cost-sharing with the City of San José) 98 projects saving approximately 652,200 CCF/year (1,497 AFY) (Table 9-3). The two qualifying projects in 2015 saved 15.6 AFY alone. The District will continue to offer this program in the future in order to reach the region's long-term water conservation goals.

Table 9-3. Commercial Program Participation between 2010 and 2015

Commercial Programs	Last 6 Years	To-Date
Custom/Measured Rebates (CCF/Year)	46,837	652,222
Custom/Measured Rebates	18	98
Toilet Rebates & Direct Installation	6,700	14,076
Urinal Rebates & Direct Installation	2,229	2,307
Commercial Washer Program	1,563	4,647
Faucet Aerator Distribution	8,650	8,650
Pre-Rinse Spray Valves	268	4,589
CII Surveys	204	513
Food Service Rebates	2	2
Total Participation[1]	**19,634**	**34,882**

[1] Total excludes CCF from Custom/Measured Rebates

9.2.3.2 Commercial Toilet and Urinal Programs

The District has been replacing inefficient toilets in commercial, industrial, and institutional (CII) sites since 1994. The CII toilet rebate programs have frequently been offered in tandem with various iterations of high-efficiency urinal (HEU) programs, HET and HEU direct install programs, and retrofit programs for urinal valve installation. An ultra low flush toilet (ULFT) rebate program was offered from 1992-1999. In 2000, the District switched to a direct installation program. Additionally, the District reimbursed the City of San José for toilets replaced through their CII ULFT programs. From 1994 through 2005, more than 8,700 ULFTs were installed through District funded programs. In 2005, the District switched to High-Efficiency Toilets, or HETs, that flush at 1.28 gpf or less. Halfway through 2015, over 14,000 HETs were installed or rebated, with more than 800 participants in the first half of 2015 (Table 9-3).

The District also recently initiated a urinal program to replace flush valves of old, inefficient 1.0 gpf or more urinals with a flush valve that uses only a 0.5 gallon per flush. Since 2010, approximately 2,310 urinals had been retrofitted or rebated (Table 9-3). Within these totals, urinal rebates were offered in all but 2013, only 188 fixtures were rebated in that time period.

By the end of 2015, only the HET direct install and HEU valve replacement programs were still in effect, yet they will continue to be offered in the future in order to reach the region's long-term water conservation goals.

9.2.3.3 Commercial Washer Program

The District and City of San José offered rebates for the replacement of high-efficiency clothes washers in laundromats, in tandem with the Custom or Measured Rebate Program. Beginning in July 2000, the Commercial Washer Program was expanded throughout the county to include commercial machines installed in multi-family complexes. More than 4,600 washers have been rebated since 1999, including 289 in 2015. Participation in this most recent year is up from the 2014 low of 194 but down from the 2010 peak of 367.

In July 2010, the District began issuing rebates only for those machines in the highest tier of water efficiency, which likely contributed to this downward trend. This criteria adjustment will encourage both the use of more efficient machines, and will be consistent with the requirements of PG&E's washer rebate programs. The rebate amount was increased from $400 to $800 in 2014 in response to the drought. The program is expected to be phased out in 2016.

9.2.3.4 Commercial Faucet Aerator Program

Since 2010, the District has offered free 0.5 gallon per minute faucet aerators to qualifying businesses and schools. Nearly 8,700 faucet aerators have been distributed through this program. After peaking in 2010 at over 3,200 aerators distributed, participation exhibited a downward trend to a low of 650 in 2013. Participation increased again in 2014 to nearly 1,000 but receded to nearly 670 in 2015. The District will continue to offer this program in the future in order to reach the region's long term water conservation goals.

9.2.3.5 Pre-Rinse Spray Valve Program

In previous years the District partnered with other agencies to offer a direct installation program for pre-rinse spray valves (PRSVs). In 2010 the District purchased a quantity of high-efficiency PRSVs with a flow rate of 1.15 gallons per minute for distribution to commercial sites, especially those identified through the District's previous CII Water Survey Program. A total of 25 of these sprayers were distributed in 2010. In both 2012 and 2015, approximately 70 pre-rinse spray valves were retrofitted, and nearly 4,600 have been installed since the District began promoting these devices in 2003 (Table 9-3). The District plans to contract with a local non-profit to facilitate installation of even more efficient PRSVsPRSVs targeting economically disadvantaged areas in future budget years in order to meet the region's long term water conservation goals.

9.2.3.6 Food Service Rebates

In 2013, the District added two new rebates targeting food service and other relevant businesses in the CII sector: Connectionless Food Steamers Rebates and Air-Cooled Ice Machine Rebates. Originally capped at $485 per compartment, the Connectionless Food Steamers rebate increased temporarily to $1,000 per compartment in response to the drought, yet only two food steamers were rebated (Table 9-3). These devices replace water-intensive connected steamers to equipment that uses an isolated ("connectionless") pan in the bottom of the steamer. The Air-Cooled Ice Machine Rebate incentive provide up to $1,000 per water-cooled ice machine replaced with air-cooled ice machines. To date, no such rebates have been issued. The District plans to continue to offer these rebates in the future in order to reach the region's long term water conservation goals.

9.2.4 Landscape Programs

9.2.4.1 Landscape Water Surveys

Analogous to the landscape portion of the Water-Wise House Call Program, the District has offered and provided large landscape water surveys in the county since 1994. Landscape managers have been provided water-use analyses, scheduling information, in-depth irrigation evaluation, a site-specific water budget, and recommendations for affordable irrigation upgrades. Each site received a detailed report upon completion of the survey. An annual report was generated to recap the previous year's efforts. Previously a stand-alone program, starting in 2015 the program was offered through the Landscape Water Use Evaluation Program (described below).

This highly successful and well-received program has conducted nearly 1,660 surveys through 2015. Participants from this program are encouraged to participate in the Landscape Rebate Program described below. The District plans to continue to offer and expand this program in the future in order to reach the region's long-term water conservation goals.

9.2.4.2 Landscape Water Use Evaluation Program (LWUEP)

The Landscape Water Use Evaluation Program (LWUEP) launched in May 2014. All sites enrolled in the program receive a monthly water usage report. The reports provide an objective evaluation of a site's water use at a glance every billing period. Various data inputs, including irrigated area, vegetation types, type of irrigation system, and daily weather (evapotranspiration minus effective rainfall) are included in a detailed calculation in order to develop the water budgets. Sites are encouraged to share the monthly reports with everyone involved with landscape

decision making at the site, including the bill payer, site manager, landscape contractor and board members. Sites are also eligible to receive a complimentary on-site landscape field survey by an irrigation expert and receive a thorough investigation of the site's irrigation issues.

A total of 557 sites were enrolled in the program at its outset from the following water retailer service areas (Table 9-4): City of Gilroy, City of Mountain View, City of Palo Alto, City of Sunnyvale, and more recently the City of Santa Clara. By the end of mid 2015, an additional 269 sites were added to bring the total number of sites to 826 and the total active sites to 814 (certain sites may suspend participation while work or renovation is completed on site, for example). By the end of 2015, 1,050 sites were active in this program with future years adding more than 1,000 additional sites from San José Water Company (predominately) and the City of Morgan Hill. When accounting for previous total reports distributed through this program, nearly 8,200 water-use reports and monthly budgets have been distributed.

Sites receiving the monthly water budget reports reduce water usage by 20 percent on average when all of the relevant parties receive the report and take appropriate actions. As of the end of 52015, the sites enrolled in the District program were saving 54 percent on irrigation usage, up from 25 percent in 2014 as compared to a cumulative average of the previous 12 months. The District will continue to offer and expand this program in the future in order to reach the region's long-term water conservation goals.

9.2.4.3 Landscape Rebate Program - Conversion Rebates

The District began to focus on water efficient landscapes by launching a version of the program in early 2005. The original program offered rebates to residential and commercial sites for the replacement of approved high water using landscape with low water use plants, mulch and permeable hardscape. Participants could receive up to $0.75 per square foot of irrigated turf grass with a maximum rebate of $1,000 and $10,000 for residential and commercial sites respectively. In an effort to expedite program participation, the District's Board approved doubling the maximum rebate from $1,000 up to $2,000 for residents and from $10,000 up to $20,000 for commercial sites in March 2009.

Currently, Santa Clara County single family, multi-family and business properties with qualifying high water using landscape can receive rebates for converting to qualifying low water using landscape with a minimum of 50 percent qualifying plant coverage; 2 to 3 inches of mulch; and a conversion from overhead irrigation to drip, micro spray, bubbler, or no irrigation. In January 2014, the Landscape Conversion rebate was increased from $0.75 per square foot (sq ft.) to $1.00 per sq ft. However, in April of 2014 in direct response to the drought, the District's Board approved adding funding to the program to support a rebate of $2.00 per sq. ft. with no maximum rebate.

Notably, the District experienced unprecedented increases in terms of rebate amounts as well as participation and interest from the community during the drought. From July 2015 to June 2015 alone, over $5.0 million dollars was rebated for approximately 2.5 million sq. ft. of conversion (nearly 60% of the historical participation). Through June 2015, the District has rebated for over 4.3 million sq. ft. of landscape conversion (Table 9-4). The District plans to continue to offer this rebate in the future in order to reach the region's long term water conservation goals.

9.2.4.4 Landscape Rebate Program - Irrigation Equipment Rebates

The District provides rebates for the following pieces of irrigation equipment:

Qualifying Hardware	Maximum Rebate Amount per Unit
Rain Sensors	$50
High-Efficiency Nozzles	$5
Rotor Sprinklers or Spray Bodies equipped with Pressure Regulation or Check Valves	$20
Dedicated Landscape Meters, Flow Sensors, or Hydrometers	$1,000
WBICs, 1-12 Stations	$300
WBICs, 13-24 Stations	$1,000
WBICs, 25+ Stations	$2,000

Similar to landscape conversion, the District Board approved adding funding to the program during the drought to support higher rebates amounts for many of the items listed above. Due to these higher rebate amounts as well as the effects of the drought, the District experienced unprecedented increases in interest and participation from the community over the last few years. In 2015 alone, more than 144,000 pieces of equipment were rebated: an increase of 112% from 2014 and representing 75% of participation since 2012 when the current iteration of the program began (Table 9-4).

Additionally, more than 2,760 Weather-Based Irrigation Controllers (WBICs) have been installed through the since 2010, including 756 installed in the year preceding June 2015 (27% of historic participation since 2006). In addition, 635 more WBICs were installed by the end of 2015. Sometimes referred to as "smart controllers", WBICs utilize the principals of evapotranspiration or "ET" to automatically calculate a site specific irrigation schedule based on several factors, including plants and soil type. The controller then adjusts the irrigation schedule as local weather changes to regulate unnecessary irrigation, saving up to 20% of irrigation water use when used properly. The District plans to continue to offer these rebates in the future in order to reach the region's long term water conservation goals.

Table 9-4. Commercial Program Participation between 2010 and 2015

Landscape Programs	Last 6 Years	To Date
Landscape Water Surveys[1]	454	1,654
Landscape Water Use Evaluation[2]	814	814
Turf Conversion[3]	3,867,528	4,345,137
Irrigation Equipment[4]	193,225	193,225
WBICs[5]	1,855	2,766
Total Participation[6]	**197,462**	**199,573**

[1] By Calendar Year
[2] Represents total active sites in program.
[3] Includes pilot programs; square footage estimated up to 2011
[4] Excludes WBICs
[5] Includes pilot programs and participation from residential and CII sites
[6] Total excludes square footage from Turf Conversion

9.3 Conclusion

The District, through a unique cooperative partnership with its retailers, offers regional implementation of a variety of water conservation programs in an effort to permanently reduce water use in Santa Clara County. Although the District is only responsible for implementation of the Foundational DMMs, it continues to collaborate with its water retailers to implement various water conservation programs on a regional basis. By taking the lead on implementing many of the various DMM components, the District is ensuring its long-term water supply reliability goals are met as well as assisting its water retailers in meeting their goals, including compliance with recent legislation calling for 20 percent reduction in per capita water use by 2020.

The District's urban Demand Management Measures are estimated to save nearly 93,000 AFY by the year 2030, using 1992 as a base year. Combined with 6,000 AFY in savings from agriculture water conservation, the total of nearly 100,000 AFY by 2030 (Table 9-1) accounts for almost 20 percent of pre-savings demand and is a crucial water supply management program, now and into the future.

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Chapter 10 – Plan Adoption, Submittal, and Implementation

This section describes the adoption, submittal, and implementation of this 2015 UWMP. A checklist is also provided to facilitate DWR's review of the 2015 UWMP.

10.1 Plan Adoption, Submittal, and Implementation

The District Board of Directors set the time and place for the public hearing on this 2015 UWMP for May 24, 2016. The District notified the water retailers on May 3, 2016 and the cities and County of Santa Clara on May 6, 2016 of the time and date of the public hearing. The draft UWMP was posted on the District's web site (http://www.valleywater.org/Services/WaterSupplyPlanning.aspx) and made available for public inspection on May 4, 2016. The public hearing notice was published on May 10, 2016 and May 17, 2016. Documentation of noticing of the public hearing is included in Appendix K.

The District Board of Directors held the public hearing on and adopted this UWMP on May 24, 2016. A copy of the conformed Board agenda package, including the adoption resolution but excluding the draft UWMP, is in Appendix K. The 2015 UWMP will be posted on the District website within 30 days of adoption. Paper copies will be made available for inspection at the same time the UWMP is posted on the web site.

Within 30 days of Board adoption, the adopted 2015 UWMP will be submitted electronically to the DWR via its Water Use Efficiency data online submittal tool (WUEdata). Electronic copies of the 2015 UWMP, including the Water Shortage Contingency Plan, will also be provided to the cities and County within 30 days of adoption. The District will make this adopted 2015 UWMP available for public review during normal business hours. The District will implement this adopted 2015 UWMP in accordance with the California Urban Water Management Planning Act.

Following adoption, the District will continue to implement water supply planning programs and projects identified in this 2015 UWMP, including those related to conservation, groundwater, and recycled water. In addition, the District will update its Water Master Plan. The Water Master Plan will identify projects and programs necessary to minimize the need to call for water use reductions greater than 10 percent during droughts. This is consistent with District BAO Interpretation Strategy S 2.4, which states, "[d]evelop water supplies designed to meet at least 100 percent of average annual water demand identified in the District's Urban Water Management Plan during non-drought years and at least 90 percent of average annual water demand in drought years." Additional projects and programs may include additional long-term water conservation savings, water recycling, recharge capacity, storm water capture and reuse, banking, and storage.

10.2 UWMP Checklist

The following checklist is provided to facilitate DWR's review of the completeness of this document, and is organized by subject matter. In addition, a complete set of standardized tables prescribed by DWR is provided in Appendix A.

California Water Code Section	UWMP Requirement	UWMP Location
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Section 10.1

California Water Code Section	UWMP Requirement	UWMP Location
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Section 2.3 Appendix B Appendix D
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	Section 10.1 Appendix B
10631(a)	Describe the water supplier service area.	Section 3.1
10631(a)	Describe the climate of the service area of the supplier.	Section 3.2
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	Table 3-2
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	Section 3.4
10631(a)	Indicate the current population of the service area.	Section 3.1 Table 3-2
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	Figure 4-1 – Historic Water Use and Population Figure 4-2 - Water Use by Sector Figure 4-3 - Agricultural Groundwater Pumping Figure 4-4 - Independent Groundwater Pumping
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	Appendix E
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	Not applicable
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Not applicable
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Not applicable
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Not applicable
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Not applicable

California Water Code Section	UWMP Requirement	UWMP Location
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Not applicable
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Section 5.1
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Not applicable
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	Table 6-5 Table 6-6
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	Section 6.1
10631(b)(1)	Indicate whether a groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	Section 6.1.2
10631(b)(2)	Describe the groundwater basin.	Section 6.1.1
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	Not applicable
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	Section 6.1.3
10631(b)(3)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	Section 6.1
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	Section 6.1
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	Section 6.5
10631(g)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years.	Table 6-4
10631(h)	Describe desalinated water project opportunities for long-term supply.	Section 6.7
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	Not applicable

California Water Code Section	UWMP Requirement	UWMP Location
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	Section 2.3
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	Section 6.3
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	Not applicable
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	Not applicable
10633(c)	Describe the recycled water currently being used in the supplier's service area.	Section 6.3
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	Not applicable
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	Sections 6.3.3 and 6.3.4 Table 6-2
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	Not applicable
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	Not applicable
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Section 6.9
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Section 6.11
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Section 7.2
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Chapter 7
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Chapter 6

California Water Code Section	UWMP Requirement	UWMP Location
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Chapter 7
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Table 8-1
10632(a)(2)	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency.	Table 8-2
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Section 8.5
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Not applicable
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Section 8.3
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Not applicable
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Section 8.3.4
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Appendix I
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Section 8.3.3
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Not applicable
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Section 9.1
10631(i)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	DMMs included in Chapter 9 of the UWMP
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Not applicable
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Section 2.3

California Water Code Section	UWMP Requirement	UWMP Location
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Section 10.1
10635(b)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Section 10.1
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Appendix K
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Section 10.1
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Appendix K
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Section 10.1
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Section 10.1
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Section 10.1
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Section 10.1

Santa Clara Valley Water District

Santa Clara Valley Water District
5750 Almaden Expressway, San Jose, CA 95118-3686
Phone: (408) 265-2600 Fax: (408) 266-0271
www.valleywater.org